

ATOM™ 1024 User Manual





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1 About

1.1 Trademarks

- LabVIEW, National Instruments, and NI are registered trademarks of National Instruments Corporation.
- Camera Link is a registered trademark of Automated Imaging Association
- GEVPlayer is a registered trademark of Pleora Technologies Inc.
- ATOMTM is a trademark of Sofradir-EC Inc.

1.2 Licensing

Software

“Software” is defined as machine-readable code or firmware, which is owned by or licensed to Sofradir-EC Incorporated, resides in Product memories, tapes, disks, CDs, or other media and provides operating instructions. With respect to any Software that is furnished to BUYER and/or BUYER’s customers (“Recipient”) hereunder, the Recipient is granted a non-exclusive, license to use the Software in conjunction with the Product(s) purchased, for the life of said Product. Notwithstanding the foregoing, the Recipient is not granted any title or ownership rights to the Software whatsoever. The Recipient is not authorized to reproduce, copy, modify, repair, decompile, reverse engineer, disassemble, reverse translate, or in any manner decode the Software. BUYER agrees to include and enforce terms no less stringent to its customers.

Use of the software on the camera, and included in any additional distribution media, is subject to the terms of the end user license agreement. You should not use the camera or any related software until you have read the end user license agreement. The complete end user license agreement is included on the "ATOM Software" CD included with your camera. By using the software, you signify that you have read the end user license agreement and accept its terms.

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Actions, however asserted, shall be commenced within two years from the date the cause of action accrues; provided, however, an action for nonpayment may be commenced at any time within four years from the date the cause of action accrues.

1.3 Warnings

The ATOM 1024 camera and related firmware and software components are not designed or intended for use or resale in hazardous environments requiring fail-safe performance, such as in the operation of nuclear facilities, aircraft navigation or communications systems, air traffic control, or other devices or systems in which a

malfunction of the camera hardware or software would result in foreseeable risk of injury or death to the operator of the device or systems, or to others.

Operating



Do not use a dedicated PoCL (Power over Camera Link) Frame Grabber with the camera.

Handling



Avoid touching the detector window. Install the dust cap when the lens is removed.



Avoid touching the lens. Install the lens cap when the camera is not in use.

Window cleaning



Cleaning of the window should only be considered in case of absolute necessity. Only use isopropyl alcohol and special lens paper for optics. Follow classical rules for optics cleaning (only translation motion without return, from the center to the edge, never use the paper twice, etc.).

Detector life



Avoid viewing very intense energy sources, such as the sun, lasers, electrical arcs, whether powered or not since this may cause damage to the detector or to its factory calibration.

Accessories

Use only the approved accessories and options with this product. Incompatible accessories may damage the camera, compromise equipment safety measures and/or provide inaccurate readings.

Restriction-of-Use Environments

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

The following disclaimers apply as non-standard, non-warranted applications:

1. Unit is not intended for permanent, fixed-mount outdoor applications.
2. Unit is not designed to withstand immersion or exposure to rain.
3. Unit is not intended for exposure to salt water atmosphere.
4. Unit is not intended for dynamic-mount applications, such as on vehicles or heavy machinery, in which the transmitted vibration is continuously sustained.
5. Unit should be placed in a carrying case when not in use.

ITAR Restriction

Equipment described herein may require US Government authorization for export purposes.

2 Model Overview

ATOM Model	Lens	HFOV (nominal)
1024-73L (LVTTL)	13mm, f1.1 manual focus	73°
1024-73C (Camera Link)		
1024-73G (GigE)		
1024-20L (LVTTL)	50mm, f1.0 manual focus	20°
1024-20C (Camera Link)	OR	
1024-20G (GigE)	50mm, f1.2 fixed focus	
1024-40L (LVTTL)	25mm, f1.2 fixed focus	40°
1024-40C (Camera Link)		
1024-40G (GigE)		
1024-67/10G (GigE)	15-100mm, f1.4 continuous zoom motorized focus	9.15-56°
1024-40/6.6G (GigE)	25-150mm, f1.4 continuous zoom motorized focus	6.6-40°
1024-40/4.4G (GigE)	25-225mm, f1.4 continuous zoom motorized focus	4.4-40°

3 Getting started

3.1 Unpacking

Carefully inspect the shipping container for damage.

Remove the contents from the box and check for visible damage.

Check if the following items are included:

1. Camera
2. Power Supply
3. CD/DVD Release Software Disk (which includes a copy of the User Manual)
4. Quick Start Guide
5. Additional Accessories ordered (Lens, cables)

3.2 What you need to get started

To setup and use the ATOM 1024 camera, the following items are needed:

- ATOM™ 1024 Camera
- For L models, customer designed hardware is required to power the camera and access the video stream.
- Power Supply
- PC running XP/Vista/Win7 with latest Service Packs installed and at least one of the following:
 - 1000Base-T Ethernet interface (for cameras with GigE Video interface)
 - Camera Link Frame Grabber (for cameras with Camera Link interface)

Note: Do not use a “dedicated” PoCL Frame Grabber to avoid damaging the Frame Grabber and/or the PC. Use either a conventional Camera Link Frame Grabber or a “switchable” PoCL Frame Grabber with SafePower which can detect if the camera is/is not PoCL compliant and handle accordingly.
- Standard Cables
 - Camera Link cable (for cameras with Camera Link) - Mini-Camera Link to Standard Camera Link (SDR to MDR) cable
 - Ethernet cable - (for cameras with GigE Video Port) - CAT-5e or better Ethernet cable
- CD/DVD Release Disk (containing software and documentation)

3.2.1 ATOM 1024 SW Support Disk contents

1. **ATOM 1024 Release Notes.pdf**
2. **ATOM 1024 User Manual.pdf** (This manual)
3. **Standard ATOM 1024 EULA 030612.pdf** (End User License Agreement)

Folders:

ATOM SW – contains (GUI Application files, NI frame grabber configuration file (.icd) (Camera Link based cameras only), Readme.txt

Pleora – contains installer and documentation for GigE Vision software (for GigE based cameras only)

3.2.2 Additional Documents

The Quick Start Guide is a brief guide to get your Atom 1024 setup, installed and running. This document is included on the software CD as well as in the box with the camera.

At additional cost, the following documents are available:

- Atom 1024 Advanced Interface Guide
- Atom 1024 Software Development Kit

3.2.3 Frame Grabber support notes

Some Camera Link frame grabbers require a minimum pixel clock of 20MHz. The ATOM 1024 will need to be configured for XGA (1024x768) Video Output Resolution to produce the required pixel clock to use these frame grabbers. If VGA (640x480) Video Output Resolution is desired, use either the NI PCI-1426 or NI PCIe-1427 Camera Link frame grabbers which have been tested and work with the ATOM 1024 cameras.

3.3 Features

- High Performance imaging – High resolution XGA format (1024x768) with superb image detail and excellent thermal sensitivity for increased range and detection performance
- Short Thermal Time Constant for sharp images of objects in motion
- Low power consumption for long battery life
- Integrates easily into multiple platforms
- External Sync feature
- Motorized Continuous Zoom Lens support

4 Hardware Overview

Incorporating ULIS's advanced all silicon microbolometer technology, the ATOM 1024 is a true High Definition (XGA format) thermal imaging module specially designed for delivering high resolution analysis and optimal thermal sensitivity to a wide variety of applications.

The ATOM 1024's small package and low power consumption coupled with its superior thermal image quality makes for ideal integration within military and COTS thermal imaging systems, and an excellent choice for handheld, ground/airborne EOIR platforms, and advanced fusion based night visions systems.

4.1 Camera Panel Description

4.1.1 Camera Link



Above is an example of an ATOM 1024 with a Camera Link video interface (with an f 1.0 50mm manual focus lens)

- See Section [4.2.1](#) for the power supply pin layout.
- See Section [4.3.1](#) for more on the Camera Link video interface.
- Camera Mount

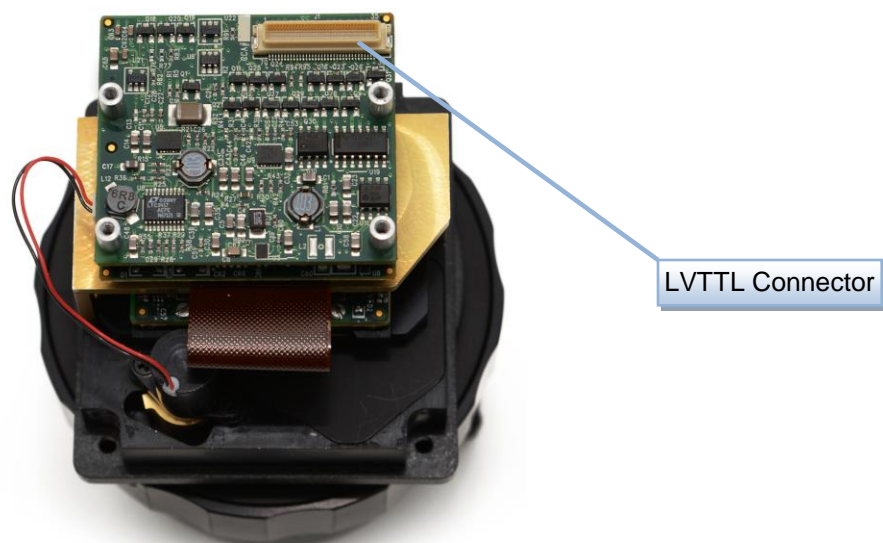
4.1.2 GigE



Above is an example of an ATOM 1024 with a GigE video interface (with an f 1.2 50mm fixed focus lens)

- See Section [4.2.1](#) for the power supply pin layout.
- See Section [4.3.2](#) for more on the GigE video interface.

4.1.3 LVTTTL

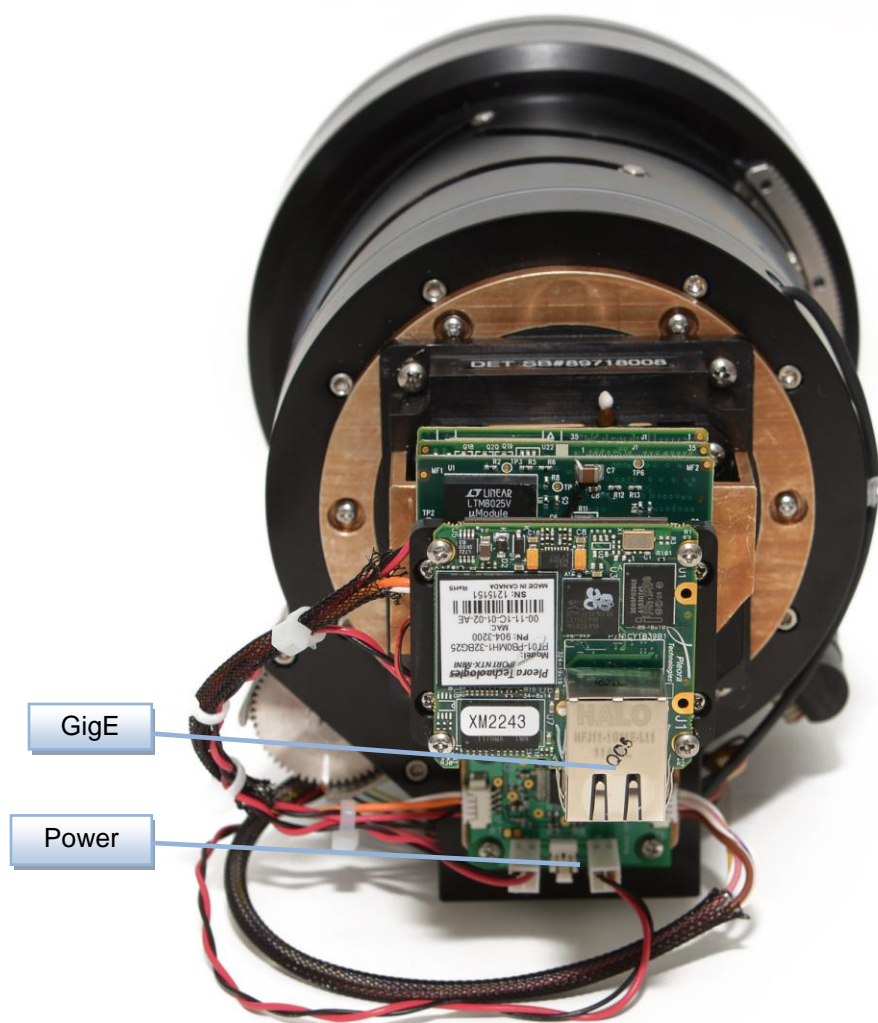


Above is an example of an ATOM 1024 with an LVTTTL video interface (with an f 1.0 50mm manual focus lens)

- See Section [4.3.3](#) for the power supply pin layout.
- See Section [4.3.3](#) for more on the LVTTTL video interface.
- The LVTTTL model does not have a Camera Mount

4.1.4 Continuous Zoom

The Continuous Zoom models come with a GigE video interface.



- See Section [4.2.3](#) for the power supply pin layout.
- See Section [4.3.2](#) for more on the GigE video interface.

4.2 Power input jack

4.2.1 Camera Link & GigE power input

Power input connection for 6V DC supply. The connector is a circular type receptacle (Hirose p/n HR10A-7R-5S(73)). See [Figure 1](#) for connector pin location and [Table 1: Power input connector pin-out](#) for connector pin-out.

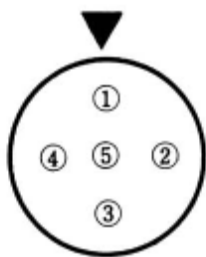


Figure 1: Power input connector pin ID

NAME	Pin
PWR (6V)	1
Do Not Use	2
GND	3
Do Not Use	4
Do Not Use	5

Table 1: Power input connector pin-out

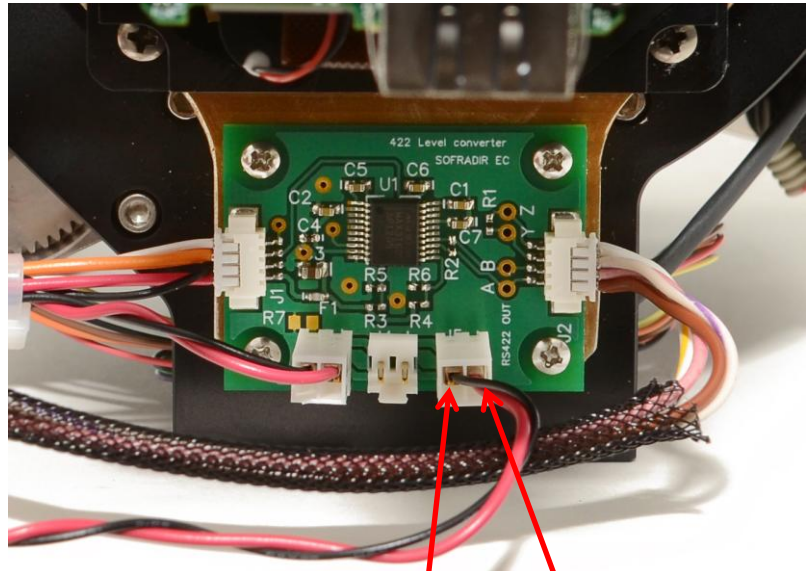
4.2.2 LVTTTL power input

See Section [4.3.3](#) for information on the LVTTTL power input.

4.2.3 Continuous Zoom power input

The parts included to power the CZ camera (with part numbers from TE Connectivity):

- Power Supply 12V 1.5A minimum
- 2-pin housing (770602-2)
- Crimps (770601-2) & Crimp Tool (58517-1)

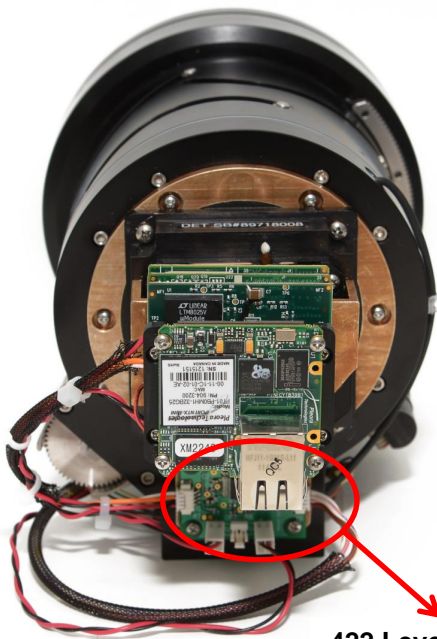


Negative Positive



ATOM 1024 CZ 25-150mm

ATOM 1024 CZ 25-225mm



422 Level Converter Board,
as displayed above

4.3 Digital Video Output Interface

Depending on the model, the Digital Video output interface will be LVTTTL, Camera Link, or GigE.

The digital video interface provides 14 bits of parallel pixel data, with clock signals identifying pixels (pixel clock), lines (horizontal sync), and frames (vertical sync). It will be selectable between uncorrected raw, full amplitude resolution non-uniformity corrected, and 8-bit gain and level compensated image data. When operating in 8-bit mode, the output bits will occupy the most significant bit positions of the parallel output channel, with the unused bit positions set to zero values.

Video imaging can be managed by making three selections:

Input field of view	This selection specifies the effective image field of view by adjusting the FPA pixel region used to generate the output image.
Output resolution	Specify the resolution of the output signal
Digital zoom level	Apply an image zoom transformation between the input and output images

The following table identifies the video modes, and provides explicit input and output resolution information for each. Not all modes are supported on all models; grayed out entries and accompanying explanations are not supported for the system shipped with this document.

Table 2: Video Modes

Physical Display	FOV	Output Frame	Frame Rate	User Zoom	# Detector Columns	# Display Columns	Actual Electronic Zoom
XGA-VGA Dual Mode	Wide	XGA	30	1	1024	1024	1
				2	512	1024	2
				3	341	1024	3.0029326
				4	256	1024	4
	Medium	VGA	60	1	640	640	1
				2	320	640	2
				3	213	640	3.0046948
				4	160	640	4
	Narrow	VGA	60	1	320	640	2
				2	160	640	4
				3	107	640	5.9813084
				4	80	640	8

When operating in the 1024x768 resolution, the FPA is configured to output the maximum resolution, with all pixels displayed. When a zoom command is applied in this mode, a smaller rectangular area of pixels centered in the original image will be digitally expanded to fill the 1024x768 output frame.

In addition to selecting the output signal resolution, the System Controller can also specify the pixel encoding and processing using the Video Tap serial command (Registers 0x11, 0x91). The output video modes supported by the ATOM 1024 Thermal Imaging Module are listed in the following table:

Table 3: Video Output Processing Modes

Video mode	Bits/pixel	NUC Applied	Gain/Level Applied	Zoom Applied	Polarity Selection Applied
Uncorrected raw	14	No	No	No	No
Corrected raw	14	Yes	No	No	No
Palletized	8	Yes	Yes	Yes	Yes

4.3.1 Camera Link interface (C models)

The Camera Link interface is compliant with the Base Camera Link standard which supports 5 LVDS pairs for the serialized video data and sync, 2 LVDS pairs for asynchronous serial communication, and 4 LVDS pairs for discrete control signals. The discrete control signals are not used with the ATOM 1024 Camera and are terminated. The connector is a Mini-Camera Link 26-pin 3M SDR receptacle. Power over Camera Link, PoCL, is not supported.

4.3.2 GigE interface (G models)

The GigE interface provides network connectivity to transmit high-speed video and control data at gigabit speeds. The connector is a RJ45 type connector with 2 LED's to display network activity and connection speed.

4.3.2.1 Network Activity LED

Table 4: GigE Network Activity LED

LED	Status
Off	No connection
Green	Connected
Blinking Green	Data is being transmitted or received

4.3.2.2 Network connection speed LED

Table 5: GigE Network connection speed LED

LED	Status
Off	No connection, 10Mbps connection, 100Mbps connection
Green	1Gbps connection

4.3.3 LVTTTL interface (L models)

The LVTTTL interface provides a connection to customer designed video output board. The video signals are 3.3V LVTTTL and are not intended to be driven over a cable. The 70-pin camera connector interface supports, 14 bits of data, framing, clock and 2 asynchronous serial signals along with 2 control signals and power. The connector is a 70-pin 0.5mm pitch board to board 2mm height header (Hirose p/n DF17(2.0)-70DP-0.5V(57)). See Table 6 for connector pin-out.

Table 6: LVTTTL connector pin-out

NAME	I/O	J1 (Pin)	J1 (Pin)	I/O	NAME
GND	I	1	70	I	SHUTTER_PWR
GND	I	2	69	I	SHUTTER_PWR
3.3V_PWR_IN	I	3	68		
3.3V_PWR_IN	I	4	67	I	3.3V_PWR_IN
3.3V_PWR_IN	I	5	66	I	3.3V_PWR_IN
3.3V_PWR_IN	I	6	65	I	3.3V_PWR_IN
GND	I	7	64	I	GND
GND	I	8	63	I	GND
		9	62		
		10	61		
RS232_TX	I	11	60		
RS232_RX	O	12	59		
CC1(External Sync)	I	13	58		
CC2	I	14	57		
		15	56		
		16	55		
		17	54		

NAME	I/O	J1 (Pin)	J1 (Pin)	I/O	NAME
		18	53		
		19	52		
PCLOCK	O	20	51	O	FRAME_SYNC
LINE_SYNC	O	21	50		
		22	49	O	D12
		23	48	O	D13
GND	I	24	47	I	GND
		25	46	O	D11
		26	45	O	D10
		27	44	O	D9
		28	43	O	D8
		29	42	O	D7
GND	I	30	41	I	GND
		31	40	O	D6
		32	39	O	D5
		33	38	O	D4
D0	O	34	37	O	D3
D1	O	35	36	O	D2

3.3V_PWR_IN: 3.3V-3.45V Conditioned Power.

SHUTTER_PWR: 3.3V-3.45V Conditioned Power.

GND: Ground

D [0:13]: 14 bits of data.

PCLOCK: Clock used to synchronize the data.

FRAME_SYNC: Frame Sync used to signal the start of a frame.

LINE_SYNC: Line Sync used to signal the start of a line.

RS232_TX: Serial Data received by the ATOM

RS232_RX: Serial Data transmitted by the ATOM

CC1: 3.3V LVTTTL signal External Sync

CC2: 3.3V LVTTTL signal (for future use)

The 14-bit parallel data bus contains full-dynamic range RAW/NUC digital output with bad pixel correction.

The ATOM 1024 system changes Output Video data on the falling edge of PCLOCK.

The system receiving data from the ATOM 1024 system should latch it on the rising edge of this clock.

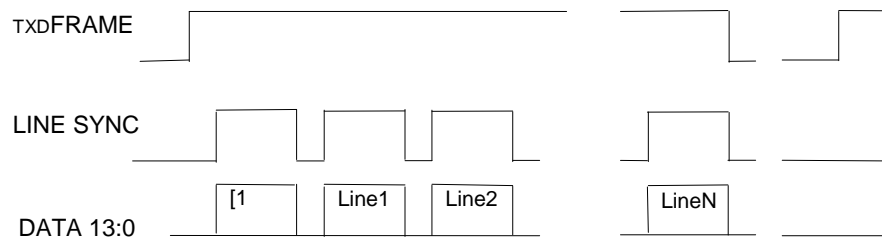


Figure 2: Digital Interface Frame Timing

Number of active LINES in each active Frame is 768 for XGA and 480 for VGA modes.

4.4 Camera Mount (for C and G models)

The ATOM 1024 C and G models have a camera mount so the camera may be mounted on a tripod. The L models do not have a camera mount.

4.5 Lenses

ATOM 1024 lenses come in three different types:

- Manual Focus
- Fixed Focus
- Continuous Zoom

4.5.1 Manual Focus (13mm & 50mm)

4.5.1.1 13mm f/1.1 Manual Focus 73° FOV



4.5.1.2 50mm f/1.0 Manual Focus 20° FOV



4.5.2 Fixed Focus (25mm & 50mm)

4.5.2.1 Fixed focus (25mm f/1.2 40° FOV)



Adjusting the 25mm Fixed Focus Lens

The fixed focus lens allows the option to unlock and change the focus; then re-lock the lens in place with the lock ring.

1. While facing the camera, use the grooves on the lock ring to turn it counterclockwise in order to unlock the inner lens.
2. Rotate the inner lens to the appropriate new location.
3. While holding the inner lens in place, use the grooves to turn the lock ring clockwise until it locks tight.



Important: Be careful to not overturn the lens; it will come off. Less than one full turn is required for the full range of focus. The minimum focus is 2 meters; a closer focus can be achieved with caution. For hyperfocal distance, focus the lens at 45 meters for focus from 25 meters to infinity. Focus the lens at 35 meters for focus from 17.5 meters to infinity.

4.5.2.2 Fixed Focus (50mm f/1.2 20° FOV)



Adjusting the 50mm Fixed Focus Lens:

1. Rotate the Focus Grip to adjust your focus.
2. When the desired focus is reached, insert the supplied lockdown screw (*replacement screw: Nylon Tip 18-8 SS Socket Set Screw 4-40 Thread, 1/8" Length McMaster part number: [90291A103](#)*) into the hole circled below.
3. Hand-tighten the screw.

Note: Do not grip the Outer Lens to change focus as it will not adjust the focus; it can turn independently of the focus grip.

Special to the Athermal Lens:

You will notice that the Lens Baffle can expand and contract up to a few millimeters. When positioning your camera for use, be sure to leave room for the Lens Baffle to move freely in and out. Restricting the fluctuation of the Lens Baffle will negatively affect the Athermal functions of the lens.



4.5.3 Continuous Zoom

4.5.3.1 25-150mm f/1.4 Continuous Zoom motorized focus 6.6-40° FOV



4.5.3.2 25-225mm f/1.5 Continuous zoom motorized focus 4.4-40° FOV



4.5.3.3 15-100mm f/1.4 Continuous zoom motorized focus 9.15-56° FOV



4.6 Accessories

- Camera Link Cable (Mini – Standard)
 - 2m (915154)
 - 5m (915155)
 - 10m (915156)
- Power Supply with serial cable (915288)
- Camera Link Frame Grabber Boards:
 - 16MB PCI-1426/16 (915219)
 - 32MB PCI-1426/32 (915220)
 - PCI-1428 (915221)
 - PXI-1428 (915222)
 - PCIe-1427 (915223)
 - PCIe-1429 (915243)
- Camera Link LVTTTL Conversion Kit (915325)

5 Installing PC Software

5.1 Third Party Tools

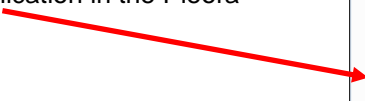
When installing all of the third party software packages, take care to review the End User License Agreements associated with each. Sofradir-EC provides these packages on our installation media as a convenience, and takes no responsibility for performance and reliability, and provides no direct support for these products.





5.1.1 Pleora PureGEV

For information regarding Pleora release compatibility, please reference the release notes.

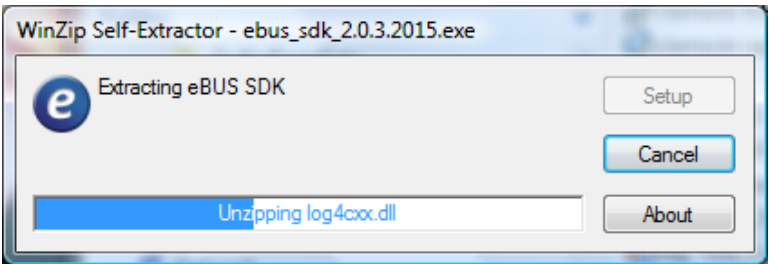
The Pleora PureGEV package includes an application to display video captured from a standard GigE Video camera. This application is named “GEVPlayer”, and may be useful in Gigabit Ethernet environments.

Run the Setup application in the Pleora folder.

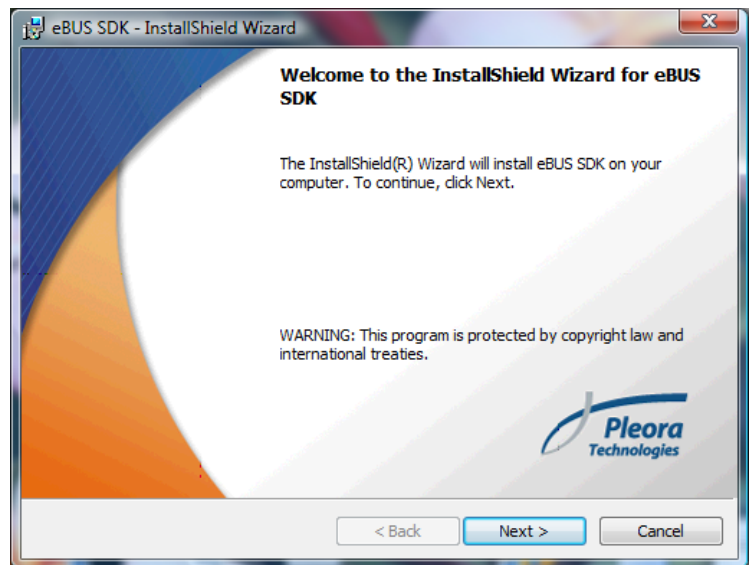


Name	Date modified	Type	Size
 configuring_your_computer_and_networ...	3/19/2012 11:11 AM	Adobe Acrobat D...	575 KB
 correcting_firewall_issues_technical_note...	3/19/2012 11:11 AM	Adobe Acrobat D...	526 KB
 ebus_sdk_2.2.0.2328.exe	4/23/2012 4:36 PM	Application	135,250 KB
 ebus_sdk_2.2.0_release_notes.pdf	4/23/2012 4:35 PM	Adobe Acrobat D...	189 KB

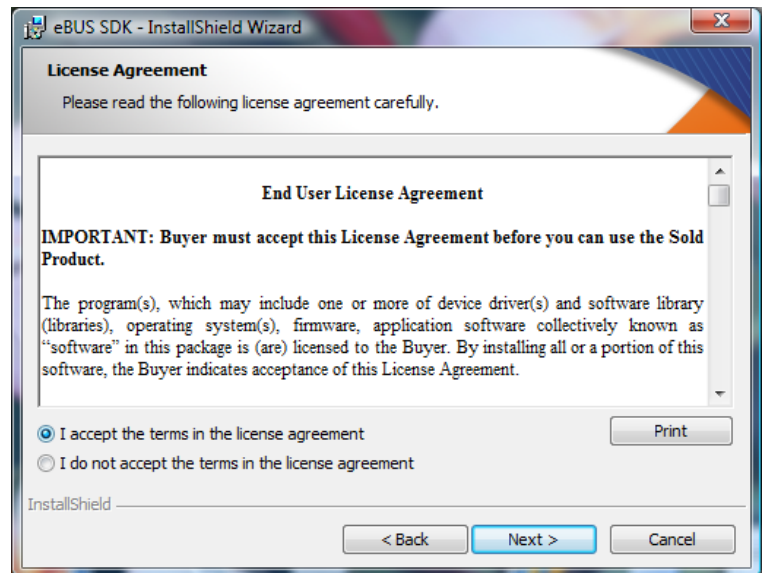
Click on the “eBUS-PureGEV Package” button to install the software.



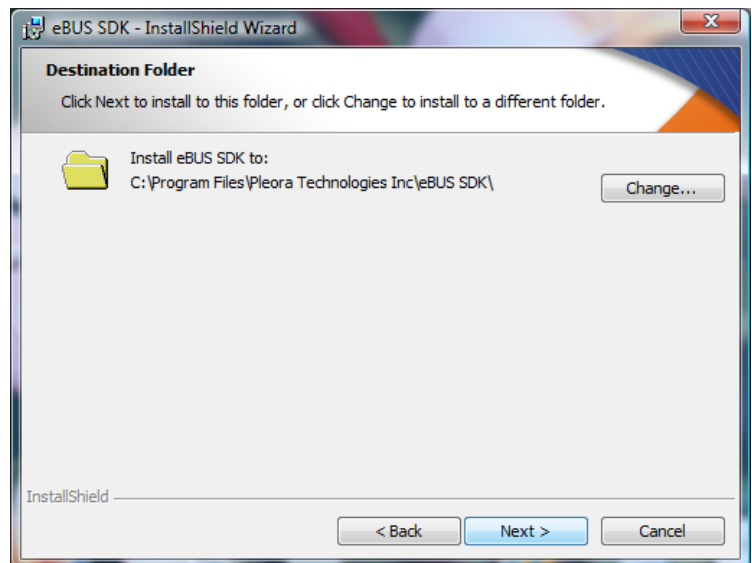
Click on the “Next” button to continue to install the software.



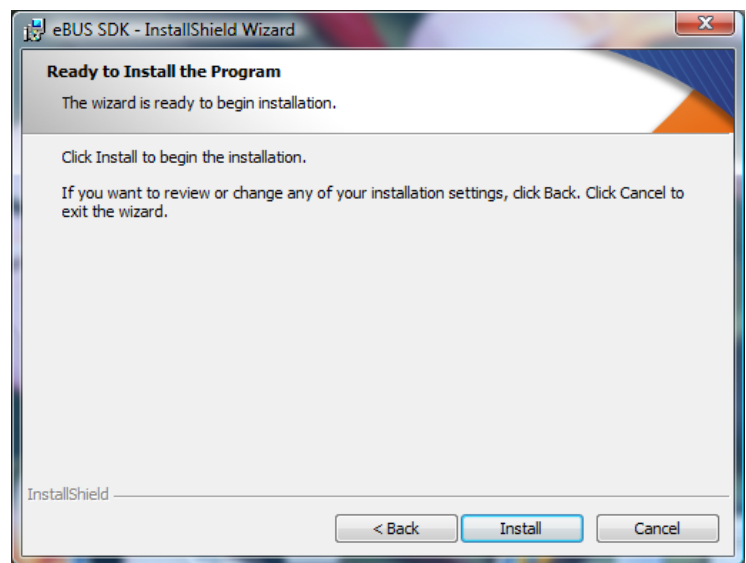
Read the end-user software license agreement and click the bullet next to the statement of accept once the license agreement has been reviewed and agreed to.
Click on the “Next” button to continue.

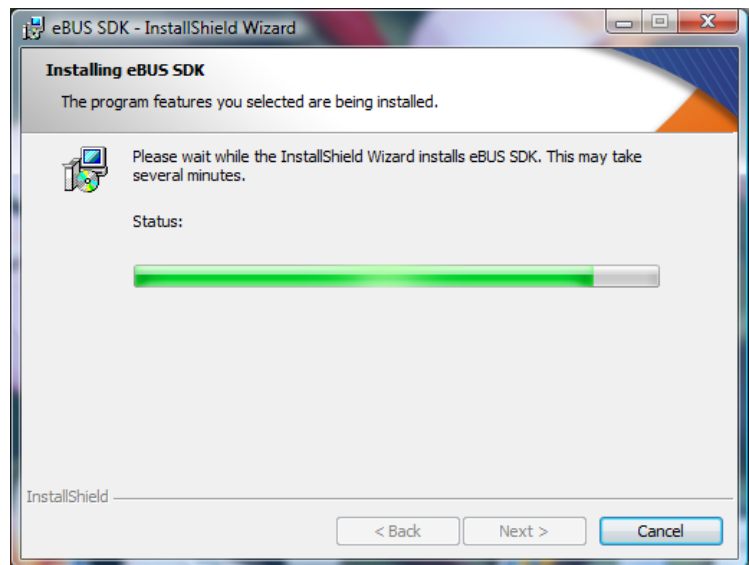


Click on the “Next” button to continue. If the default folder location is not acceptable click on the “Change” button to edit the folder location then click on the “Next” button to continue.

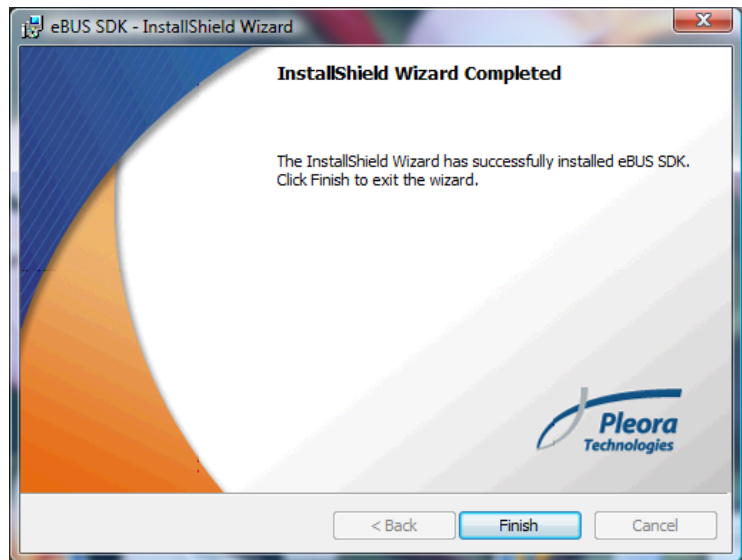


Click on the “Install” button to continue.

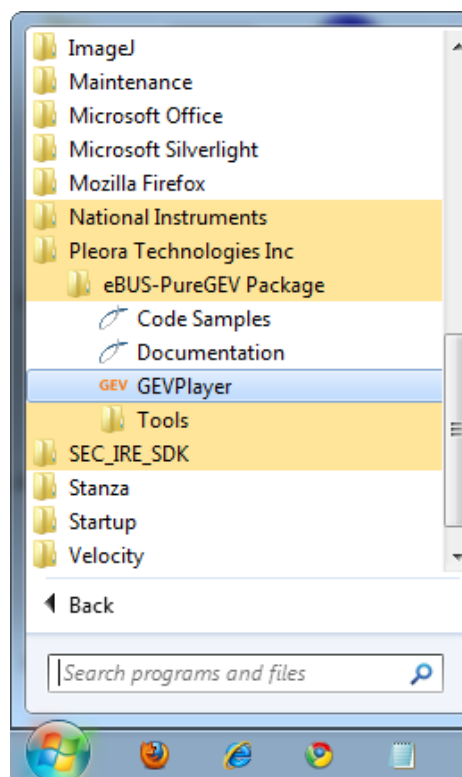




Click on the “Finish” button when completed.



Following a successful installation, these new items should appear on your Start menu under the Pleora Technologies Inc heading. Select the item for GEVPlayer to start the video acquisition application.



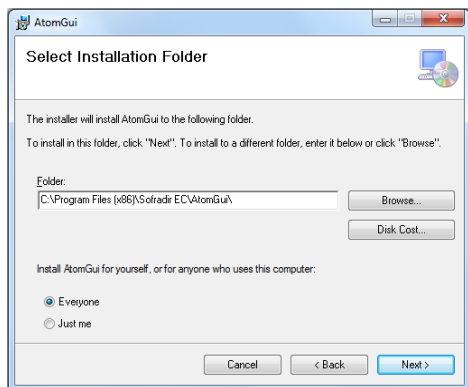
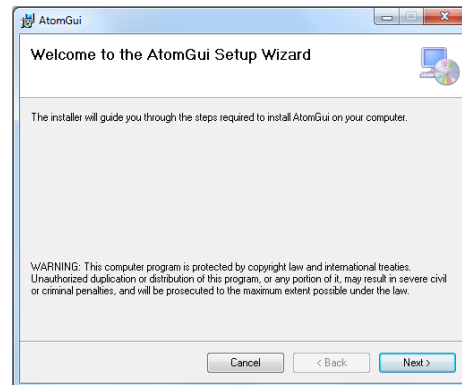
5.2 Sofradir-EC Tools

Review the Readme.txt file for ATOM GUI application installation instructions.

5.2.1 ATOM GUI Application

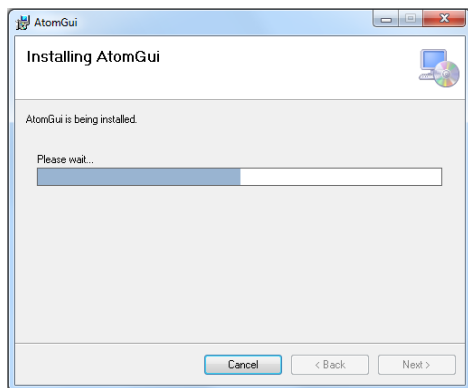
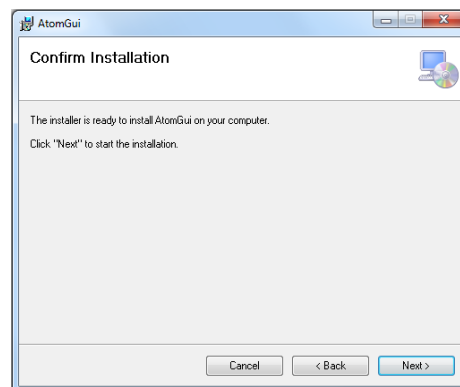
The ATOM GUI application is the program that allows you to send communications to your ATOM 1024 camera.

Initiating the ATOM GUI setup wizard will present you with a preliminary welcome screen. Click 'Next' to proceed to the installation folder.



The recommended settings will present the ATOM GUI installation path by default. A manual installation path can be selected by clicking browse, and selecting a folder through the explorer. Also, at this point you may select your preference as to how ATOM GUI may be accessed between accounts.

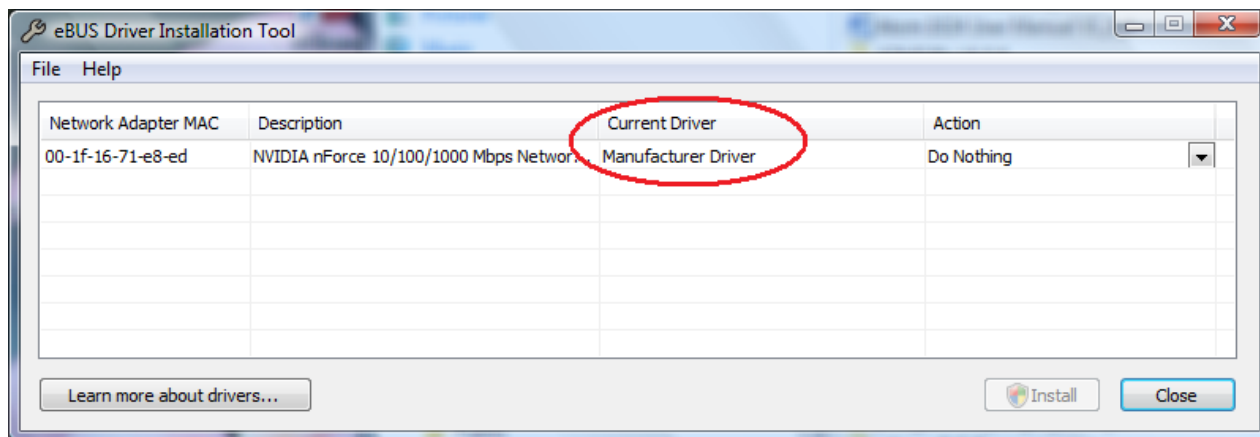
Click 'Next' to proceed to the next installation screen, and then next again to commence installation.



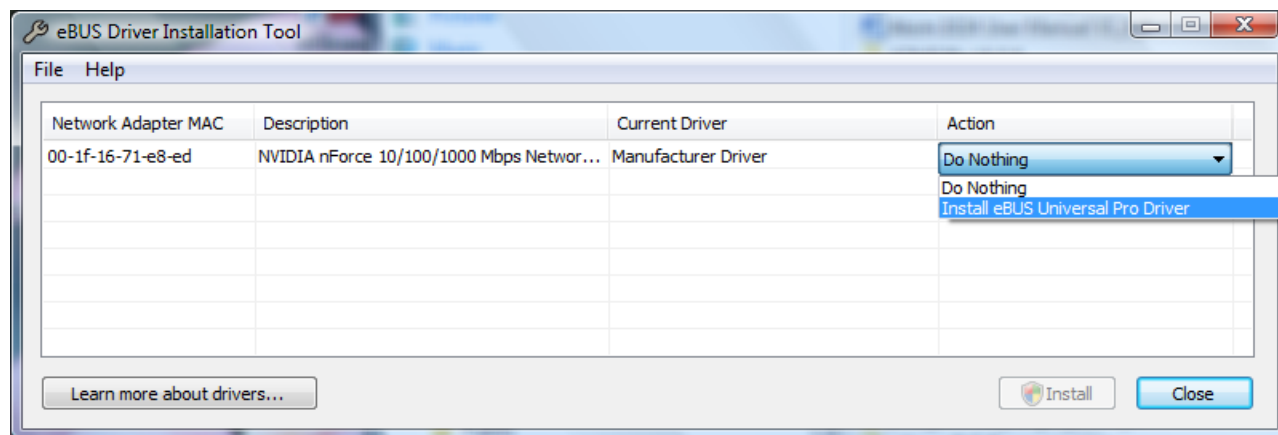
Your installation will proceed with a status bar at this point. Selecting cancel at any time prior to completion will abort the installation procedure. Once this has completed, click 'Close'.

5.3 Install the Pleora Ethernet device driver (for GigE camera models)

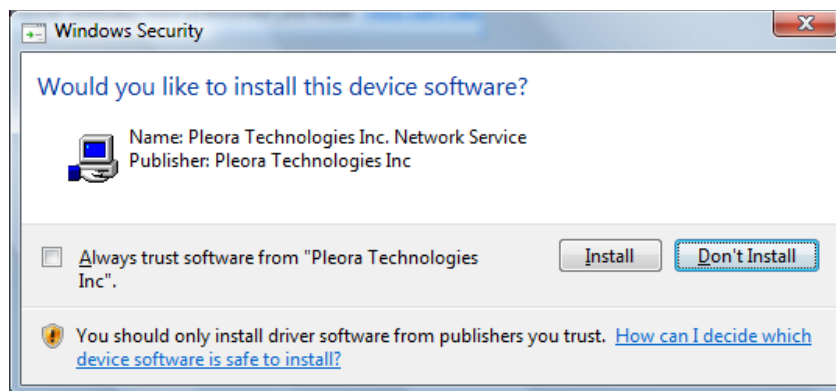
1. Run the **Driver Installation Tool** from **All Programs > Pleora Technologies Inc. > eBUS SDK > Tools**



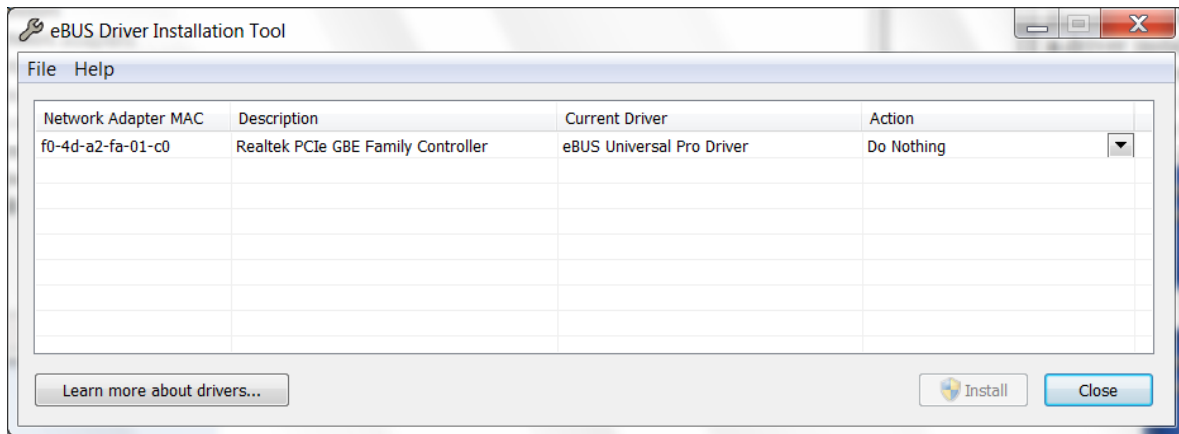
2. Verify the current driver installed.



3. Select the driver from the Action pull down menu then click Install.



- Click Install again to install the device driver.



- Verify the Current Driver installed is an eBUS driver.
- Click Close when done.

6 Installing Camera Files

Cameras using the Camera Link interface require camera files for the NI software to communicate between the NI frame grabber and the camera.

6.1 NI camera file (*.icd)

- Locate the NI camera file (*.icd) on the CD/DVD Release disk or electronic mail.
- Copy the NI camera file to:

- Vision Acquisition Software prior to 8.2.3

Place the *.icd file in <National Instruments>\NI-IMAQ\Data

- Vision Acquisition Software 8.2.3 and later

For Windows XP, place the *.icd in C:\Documents and Settings\All Users\Shared Documents\National Instruments\NI-IMAQ\Data

For Windows 7, place the *.icd in C:\Users\Public\Public Documents\National Instruments\NI-IMAQ\Data

6.2 Customize the NI Camera File to operate with a different frame grabber

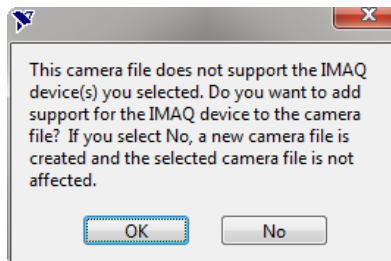
The distribution media, CD/DVD or electronic mail, contains a NI Camera File that is designed to work with the most popular NI Camera Link frame grabbers: the PCI-1426, and the PCIe-1427. If you have a different NI frame grabber, you can modify one of the provided camera files to work with your frame grabber using the NI Camera File Generator software. An installer for this package is provided on the distribution media in the folder “\National Instruments\Camera File Generator”.

To use the NI Camera File Generator to add support for additional frame grabbers, follow these steps on the PC that has the target frame grabber installed:

1. Verify that the SEC provided camera files (.icd) have been copied to the appropriate folder on your PC, as described in the section above.
2. Run the NI Camera File Generator program.
3. On the initial screen, click on the button labeled “Open Existing Camera File.”



4. Navigate to the NI camera file folder, and select one of the provided SEC camera files (e.g. Sofradir-EC ATOM 1024.icd).
5. The program should notify you that the opened file does not support the installed frame grabber, and offer to update it to include support. Click on the “Yes” button:



6. Click on the “File” item in the program’s menu bar, and save the camera file with a new name.
7. Close the NI Camera File Generator program.
8. You should now be able to select and use this new camera file from within the NI Measurement & Automation application to display video. Note that if it is more convenient, the NI Camera File Generator program can also be used to display streaming video from the camera.

7 GigE Connection Configurations (for GigE camera models)

7.1 Configure Windows Firewall (for GigE camera models)

Configure Windows Firewall to allow GEV Player through.

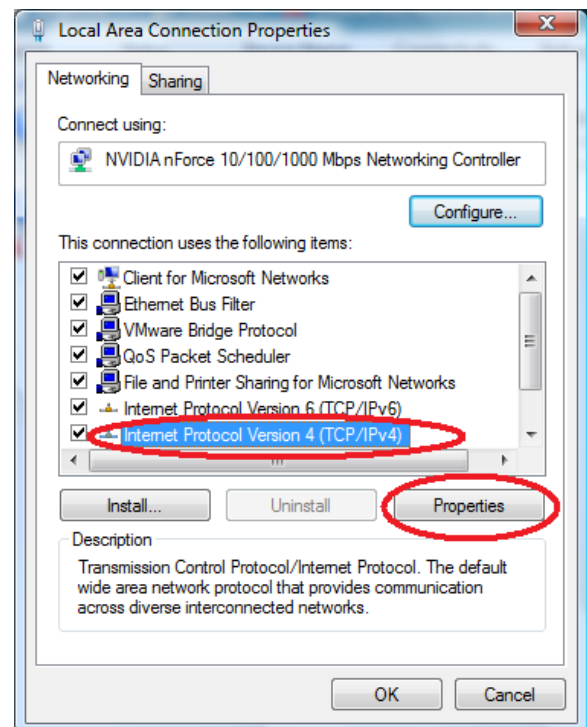
1. From the Start menu, select **Start > Control Panel**
2. From the Control Panel, select the category **System & Security**, then **Windows Firewall**
3. From Windows Firewall, select **Allow a program through Windows Firewall**.
4. Put a check in the box for GEVPlayer. **Note:** If GEVPlayer is not listed, select the Add program button and add it to the list.
5. If other firewall software is installed (e.g. Norton Internet Security), use the equivalent procedure to permit access.

7.2 Configure the GigE for point-to-point connection (for GigE camera models)

7.2.1 Configure the PC NIC for static IP address (for GigE camera models)

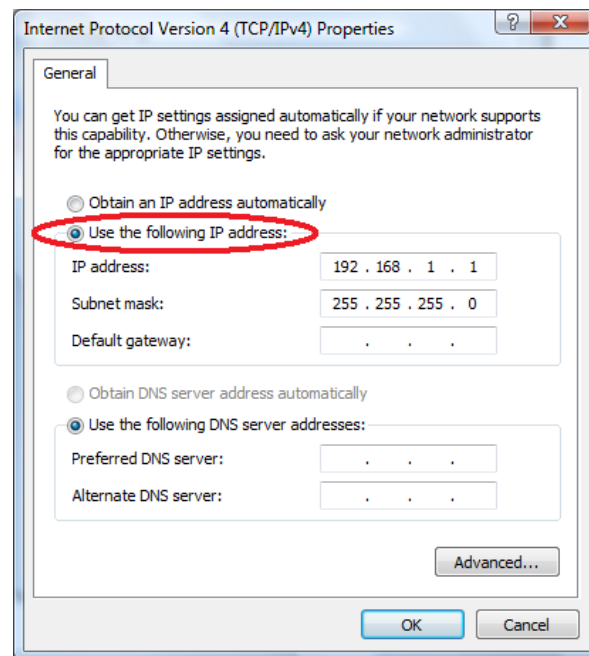
The PC NIC will need to get an IP address, either from a DHCP server if in a typical network setup or manually programmed in a point-to-point connection.

1. From the Start menu, select **Start > Control Panel**
2. From the Control Panel, select **Network and Sharing Center**
3. Right click on local network connection and select **Properties**.
4. Select Internet Protocol Version 4 (TCP/IPv4) and click the Properties button.



5. Select the “Use following IP address” bullet and enter **192.168.1.1** for the IP address and **255.255.255.0** for the Subnet mask.

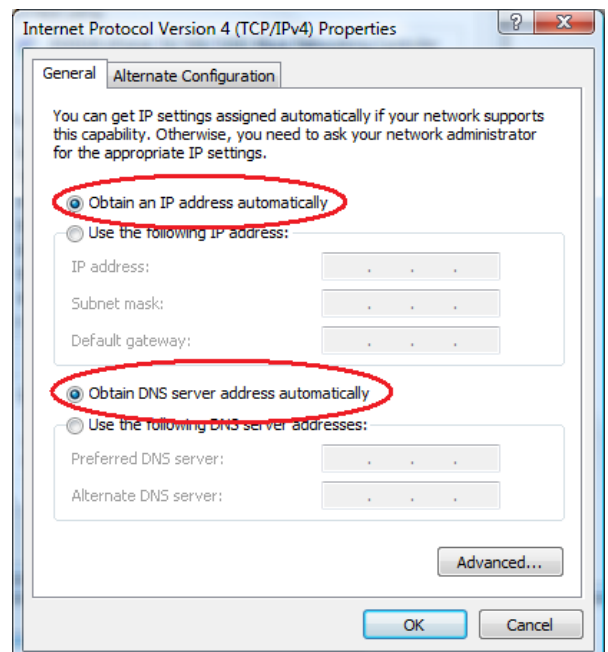
Note: The Subnet mask may automatically be filled in with 255.255.255.0 after the IP address is entered.



6. Click Ok when done.

7.2.2 Restore NIC setup for network connection (DHCP delivered IP address)

1. Select the “Obtain an IP address automatically” and “Obtain DNS server address automatically” bullets.
2. Click Ok when done.



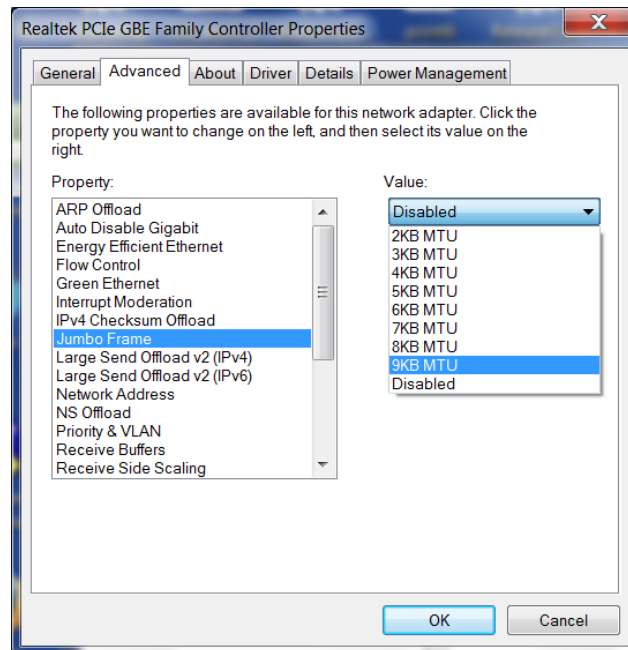
7.3 Jumbo frames/packets setup (for GigE camera models)

Before using Jumbo frames, make sure the PC NIC and Ethernet switches support Jumbo frames, otherwise the packets will be discarded.

7.3.1 PC NIC setup for jumbo frames/packets

For Windows 7,

1. Select Start
2. Right-click on Computer
3. Select Manage
4. Click on Device Manager on the left side
5. Click on Network Adapters in the center
6. Right-click on the Network Adapter being used
7. Select Properties
8. Click the Advanced Tab
9. Select Jumbo Frames from the list of properties and select the MTU size from the value pull-down
10. Click Ok when done and close the Computer Management window.



7.3.2 Verify setup of jumbo frames/packets

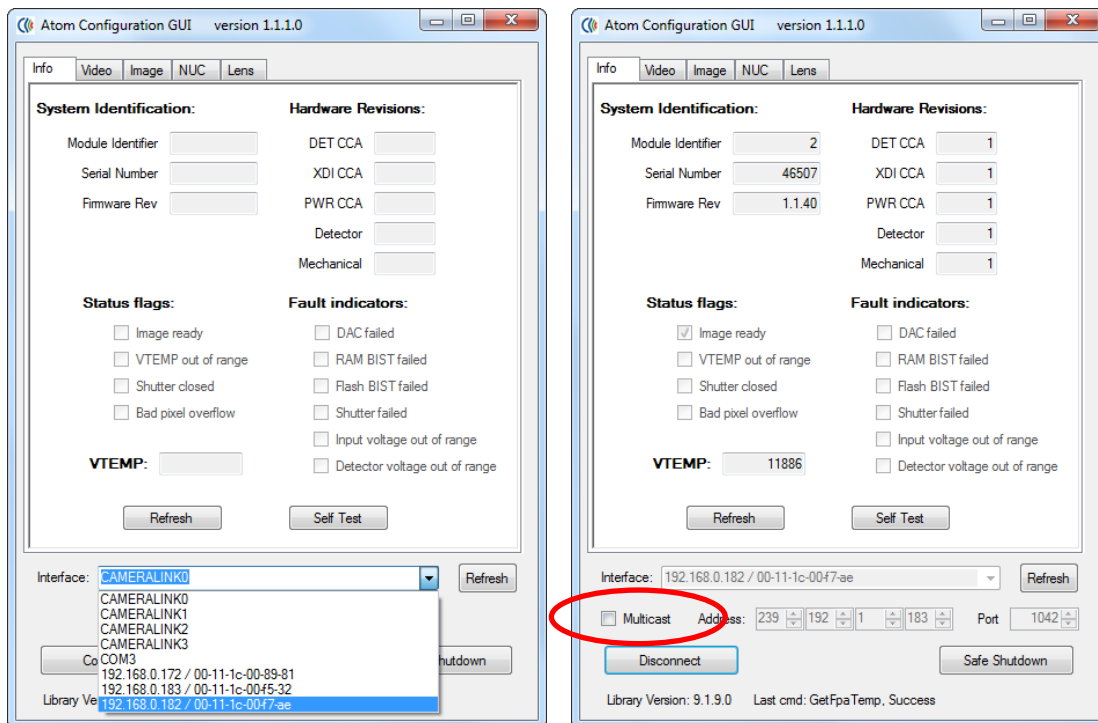
1. Open a Command Prompt window, Click on **Start > Run**, then type **Cmd** in the Run box and click Ok.
2. In the Command Prompt window, type the following and hit Enter
ping [-f] [-l size] [target name or IP address]
ping -f -l 9000 192.168.0.133
3. Verify ping works.

7.4 Enabling simultaneous camera control and image acquisition (for GigE camera models)

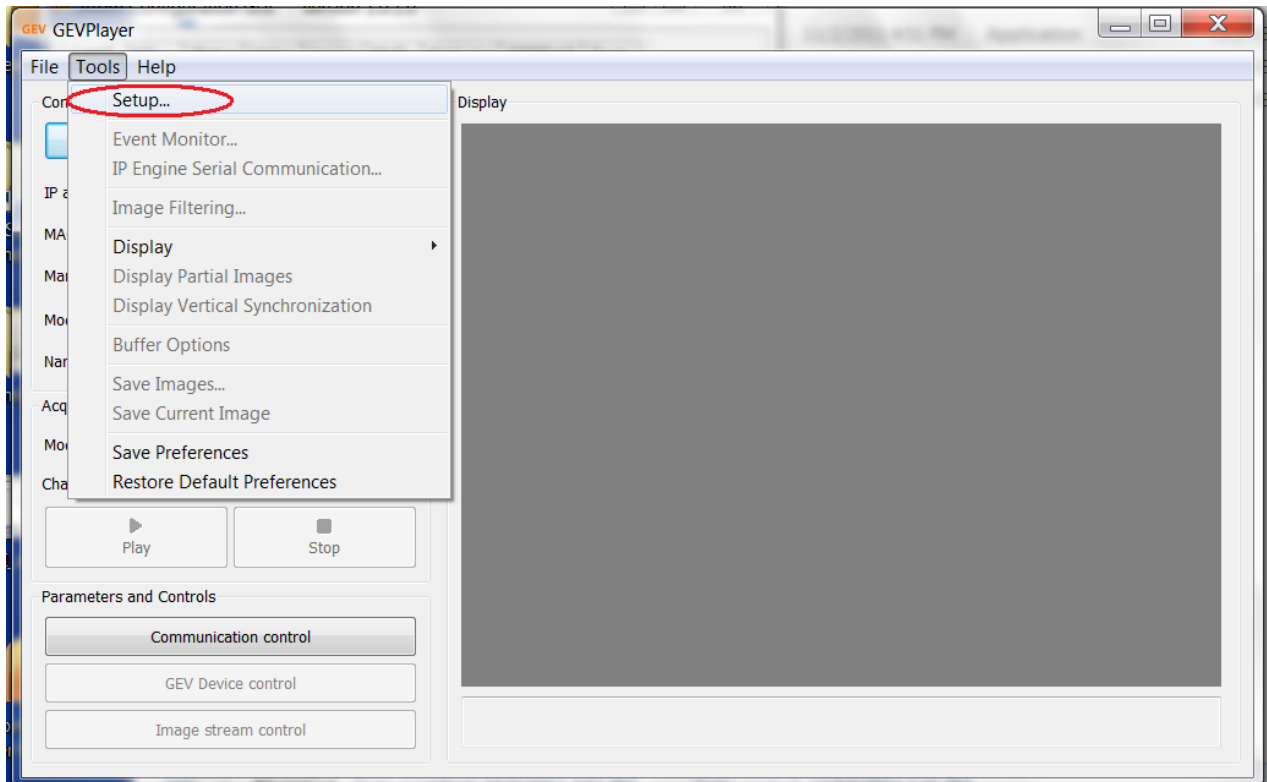
For the user to control the camera while acquiring images, the Pleora GEV Player must be set as a data receiver and multicast mode must be used for streaming. Without multicast enabled, video can be displayed, but the camera controls are unavailable.

Important Note: Multicast mode uses IGMP and requires an IGMP compliant Ethernet switch if used in a network. If connecting point-to-point, an IGMP compliant Ethernet switch is not required.

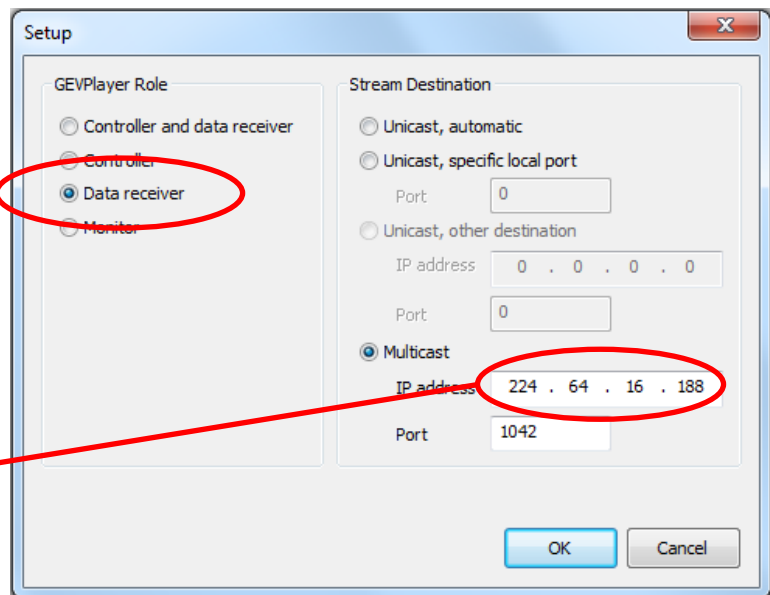
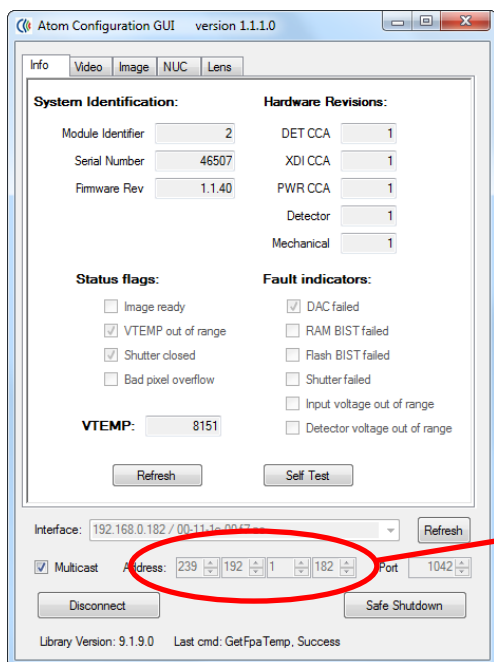
1. Make sure GEV Player is setup correctly, (i.e. network, point-to-point, image size), and can acquire video.
2. Click the Stop button and the Disconnect button.
3. Launch AtomGui from your computer by clicking the AtomGui.exe application file.
4. Select your method of connection from the Interface pull-down menu.
5. Click the Connect button.
6. Select the Multicast check box as seen below.



7. From the GEV Player main screen, Select Tools then Setup.



8. From the Setup window, select **Data receiver** and **Multicast**.



9. Make sure that the Multicast address from the GEV Player matches the Atom Gui Multicast Address (as shown above)

10. Click **Ok**
11. In GEV Player, Click the Select / Connect button.
12. Select your Gig-E interface and verify that the *Access Status* says “Control” highlighted in yellow.
13. Click OK
14. The GEV Player should now display video and the GUI can be used to control the camera.

Note: The Play and Stop button are not active as well as the GEV Device control button so if a change in image size is needed the GEV Player will need to be set back to Controller and Data receiver.

8 Getting an Image

8.1 Connecting your camera and powering on

1. Connect the digital video interface to the acquisition hardware with the appropriate cable.
 - a. For LVTTL, connect the custom designed hardware, connected to the LVTTL 70-pin connector, to the appropriate designed for ima acquisition hardware with an appropriate cable.

Note: The custom designed hardware should have a video interface from which to connect to an image acquisition device.
 - b. For Camera Link, connect the Mini-Camera Link connector to the Frame Grabber with a Camera Link cable.
 - c. For GigE, connect the GigE Video RJ-45 connector to a network switch or directly to a PC's gigabit Ethernet port with a Cat-5e or better Ethernet cable.

Note: Review the following and perform the necessary steps.

 - i. Update to the Pleora Ethernet Driver (See Section [5.3](#))
 - ii. Configure Windows Firewall (See Section [7.1](#))
 - iii. Decide on either point-to-point or network connection
 - iv. Configure NIC IP address (if point-to-point; See Section [7.2.1](#))
 - v. Configure Camera's GigE IP address (if point-to-point)
 - vi. Configure NIC for Jumbo packets (See Section [7.3](#))
 - vii. Configure switches for Jumbo packets

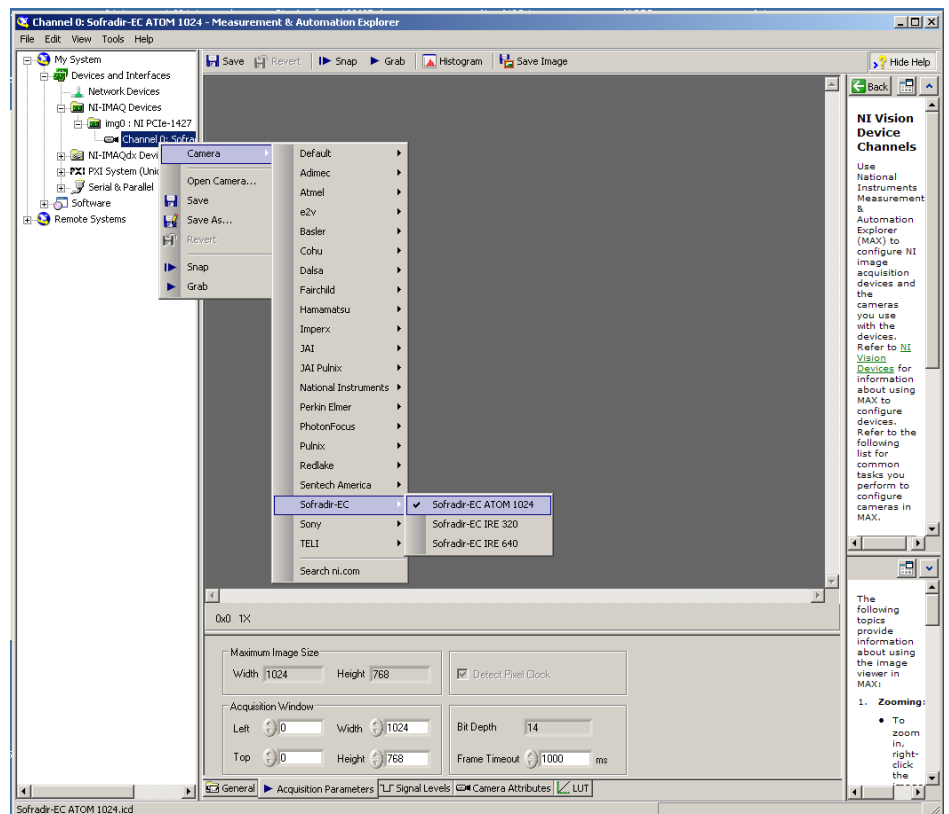
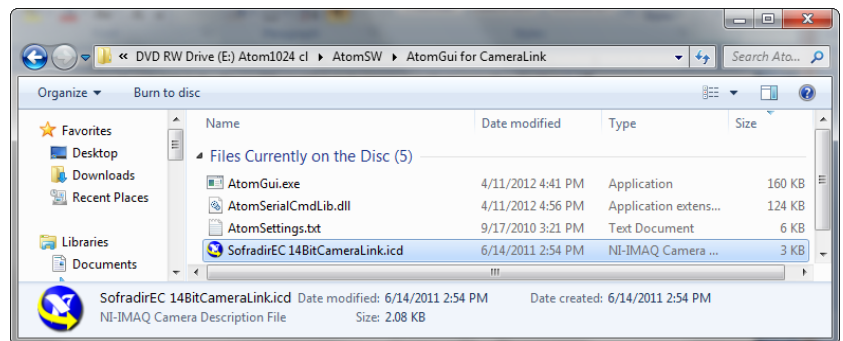
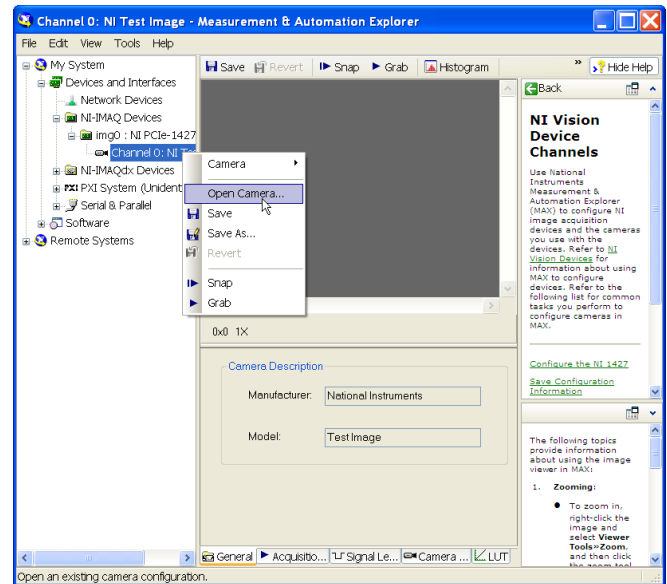
Additional Note: Try to acquire images without user control first. Once this is accomplished, configure the PC and cameras GigE Video interface to add simultaneous user control if needed.
2. Connect the Power Supply to the camera and plug into an AC outlet.

Note: After power is first applied, the shutter can be heard closing and opening.

8.2 Acquire an image

8.2.1 Camera Link interface

1. Launch Measurement & Automation Explorer (MAX) from the desktop shortcut or the start menu. (Make sure your Atom CD installation CD is in your computer before your first use.)
2. In the **Configuration** panel, select **Devices and Interfaces > NI-IMAQ Devices**.
3. Under the NI-IMAQ Devices the image acquisition hardware will show, select the image acquisition hardware to use, (i.e. **img0 : NI PCIe-1427**).
4. Select the channel of the image acquisition device.
5. *For your first use*, right-click on the **Channel** item and select **Open Camera**. This will allow you to browse to your Installation CD's camera file.
6. Navigate to your CD-drive containing the Atom1024 installation disk. Navigate to *AtomSW > AtomGui for CameraLink > SofradirEC14BitCameraLink.icd* (as seen to the right).
7. *For following uses*, right-click **Channel**, click the **Camera** drop-down and choose the **Sofradir-EC** selection (as seen to the right) and choose the appropriate camera.
8. From the **Acquisition Parameters** tab near the bottom of the window, setup the Width and Height.
9. Click **Snap** to acquire a single image or click **Grab** to continuously acquire images.
10. Right-Click the image and select **Viewer Tools > Zoom to Fit** for the full image.



8.2.2 GigE Video interface

Review the following and perform the necessary steps.

- a. Update to the Pleora Ethernet Driver to improve performance (See Section 5.3)
- b. Configure Windows Firewall to allow GEV Player through (See Section 7.1)
- c. Configure for network or point-to-point connection
- d. If point-to-point connection, configure static IP addresses for PC NIC and Camera GigE port (See Section 7.2.1)
- e. Configure for Jumbo packets (not required) (See Section 7.3)
- f. Use workaround steps to simultaneous use the GUI to control and GEV Player to acquire images

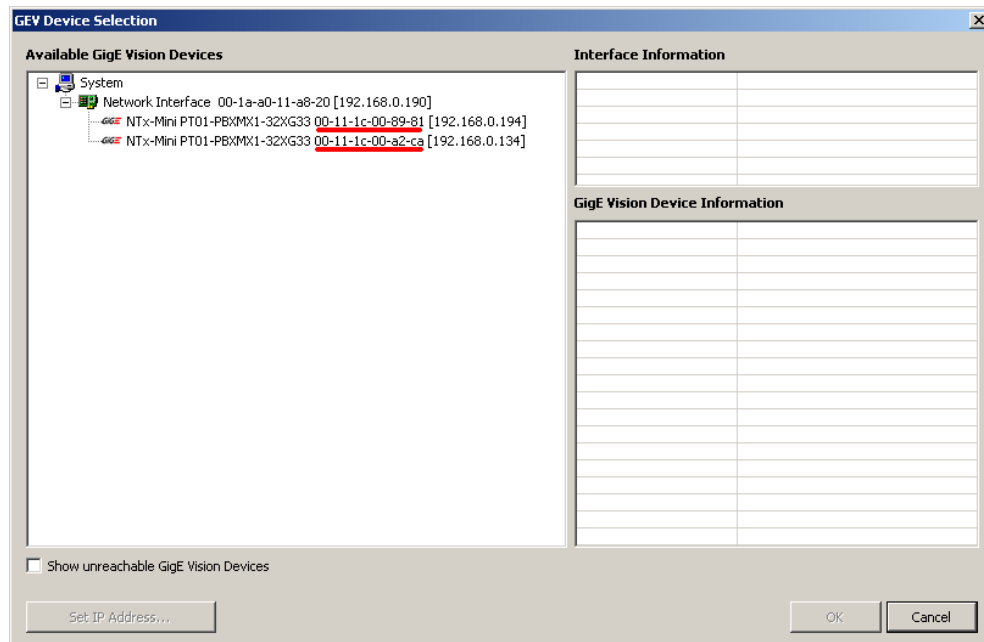
Acquire video by performing the steps for a network connection or point-to-point connection.

Note: There is a workaround needed to be performed in order to simultaneously use the GUI to control the camera and use GEV Player to acquire images. See Section 7.4 on the steps needed to be performed.

8.2.2.1 GigE Video interface network connection

1. Launch GEVPlayer from the desktop shortcut or the start menu.
2. Click the Select / Connect button.
3. Select the Gig-E interface.
4. If your device is not listed, select the “Show unreachable GigE Vision Devices” checkbox. Click on “Set IP Address” and enter an appropriate address and net mask.

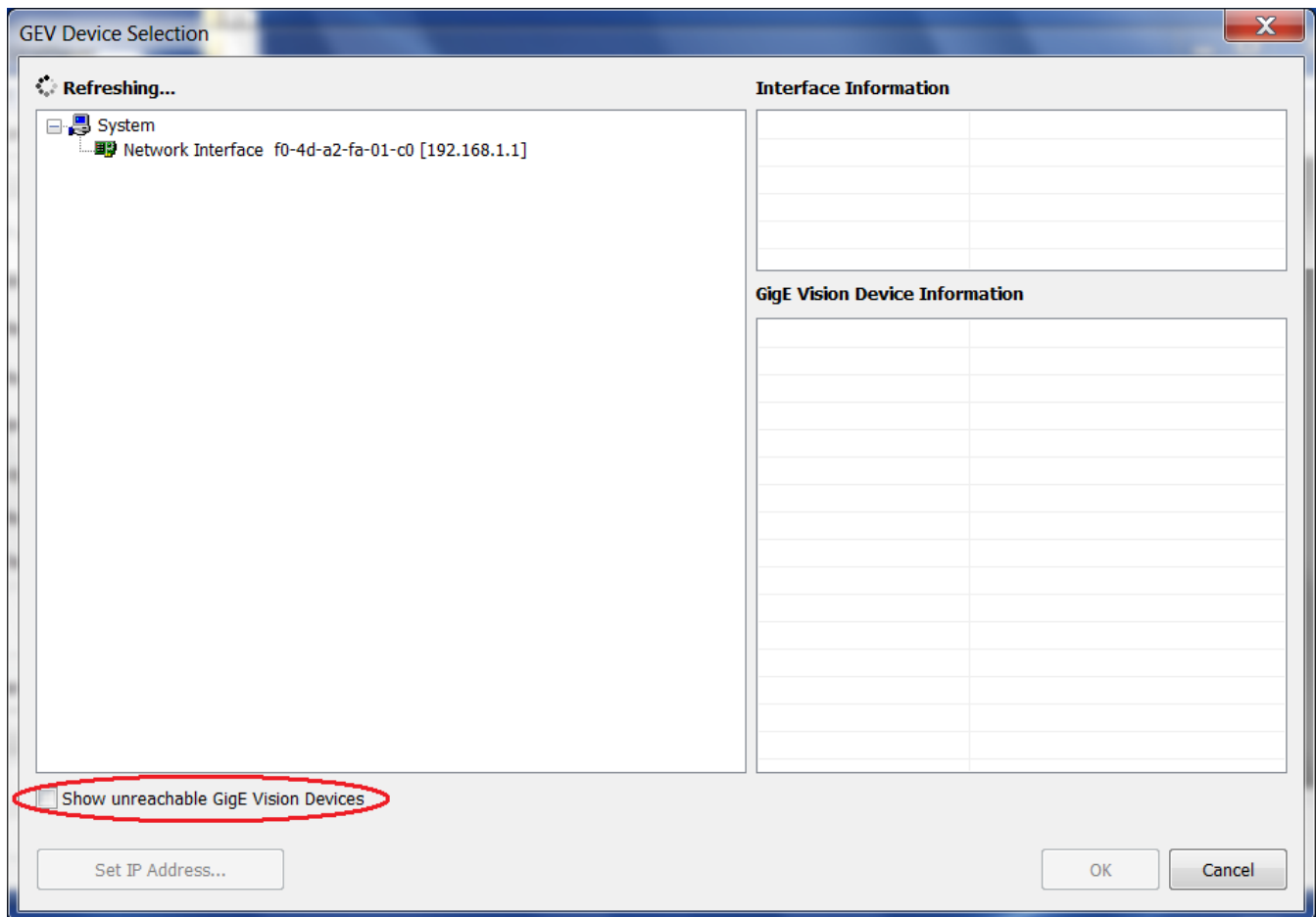
Note: If more than one camera is located, verify the correct interface with the MAC address.



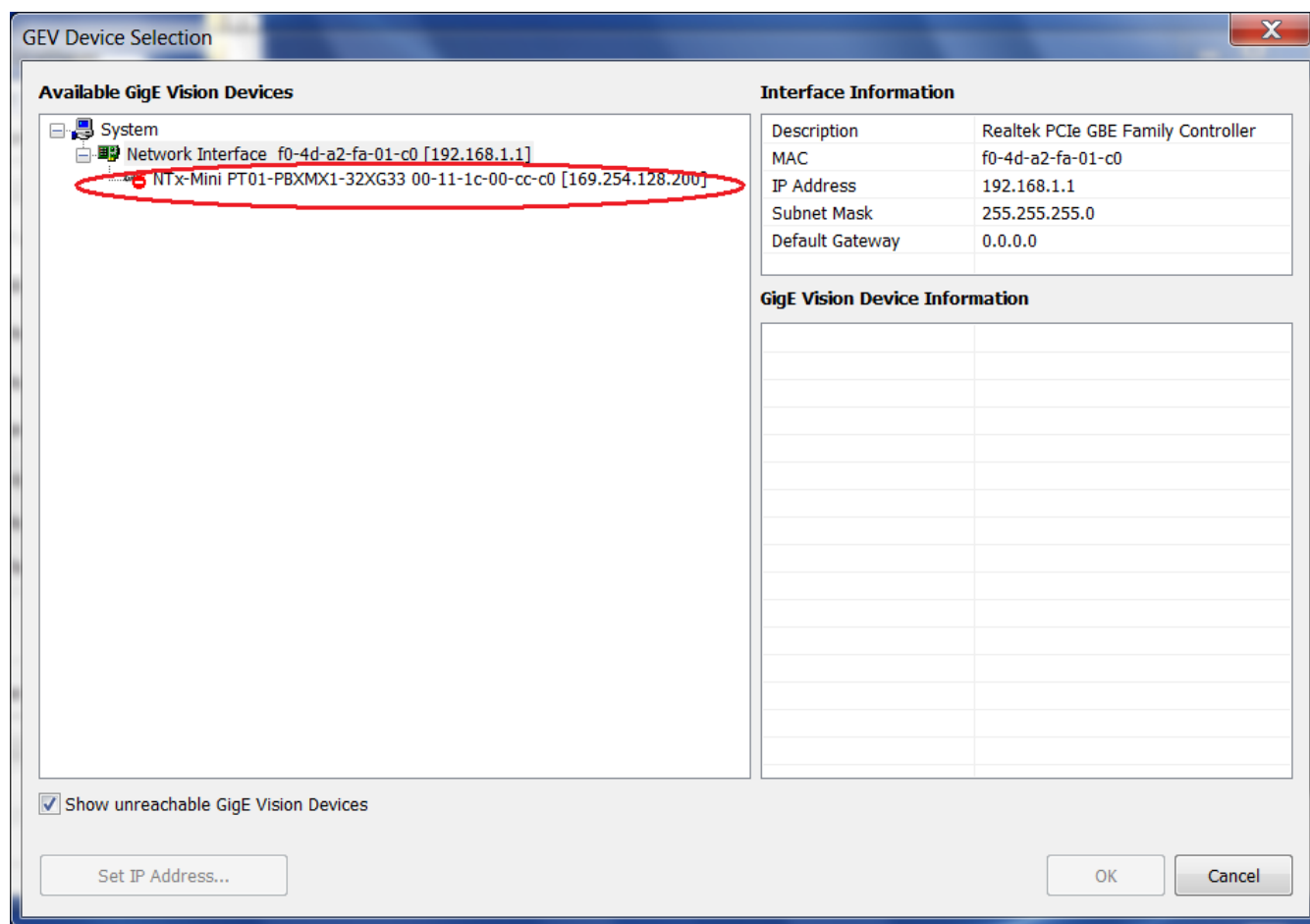
5. Click the Play button
6. Observe Error count is 0 and the Stream number of images is incrementing.

8.2.2.2 GigE Video interface point-to-point connection

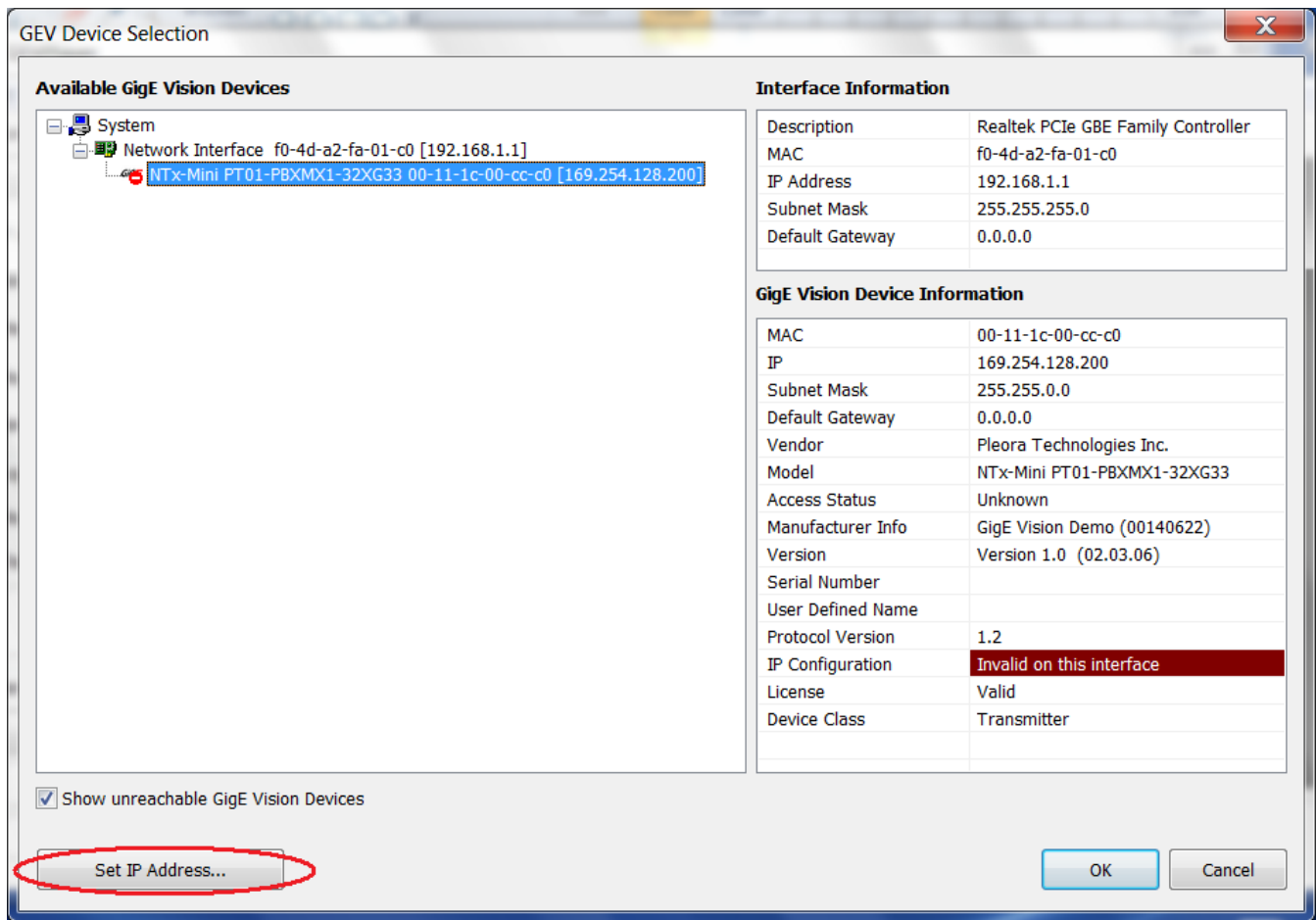
1. Configure the PC's NIC for a static IP address (Section [7.2.1](#))
2. Launch GEVPlayer from the desktop shortcut or the start menu.
3. Click the Select / Connect button.
4. Check the Show unreachable GigE Vision Devices.



5. Select the Gig-E interface.



6. Select the “Set IP Address...” button.



7. Enter a two as the last digit of the IP address and click OK.

Set IP Address

NIC Configuration

MAC Address: f0-4d-a2-fa-01-c0

IP Address: 192.168.1.1

Subnet Mask: 255.255.255.0

Default Gateway: 0.0.0.0

GigE Vision Device IP Configuration

MAC Address: 00-11-1c-00-cc-c0

IP Address: 192 . 168 . 1 .

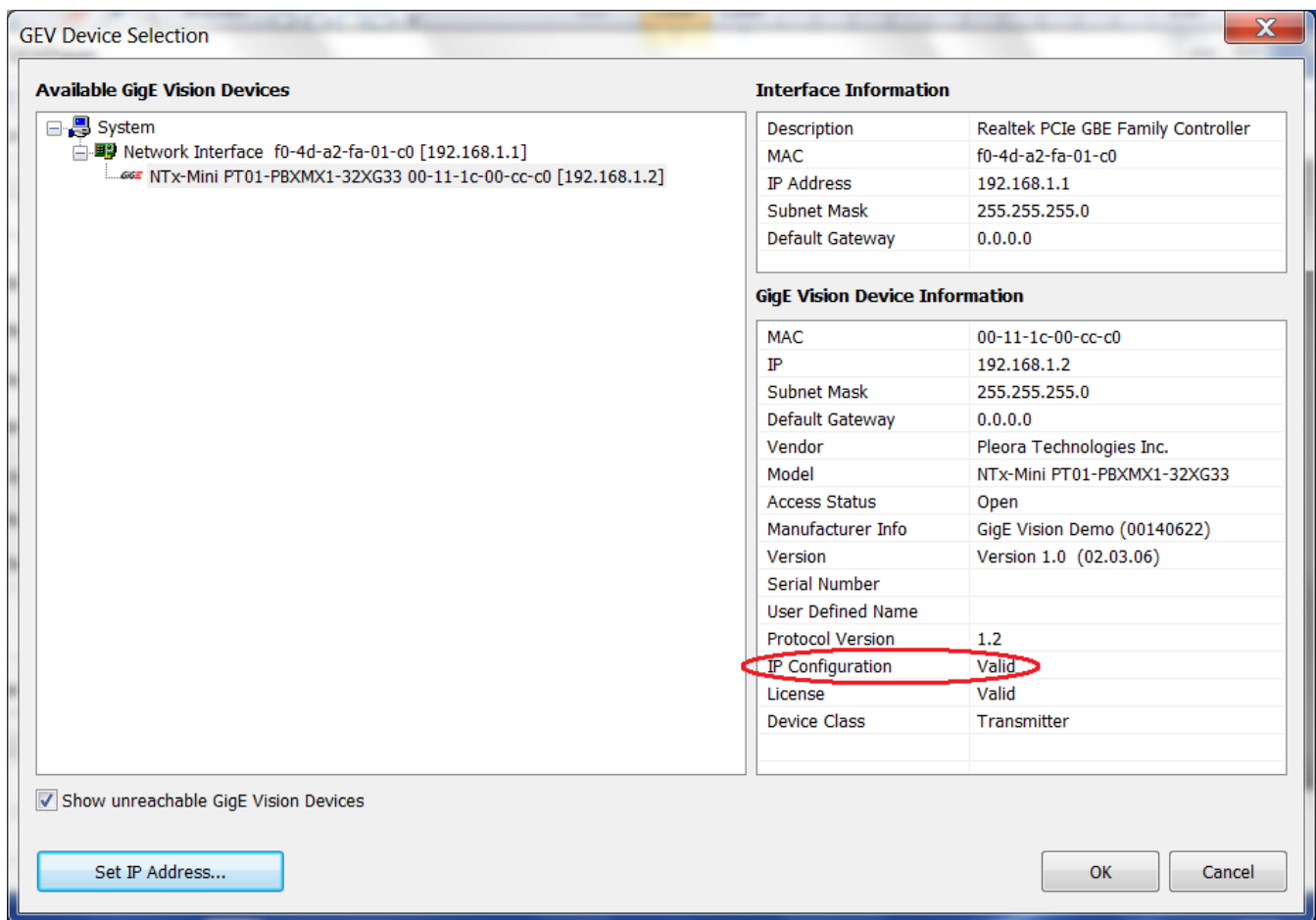
Subnet Mask: 255 . 255 . 255 . 0

Default Gateway: 0 . 0 . 0 . 0

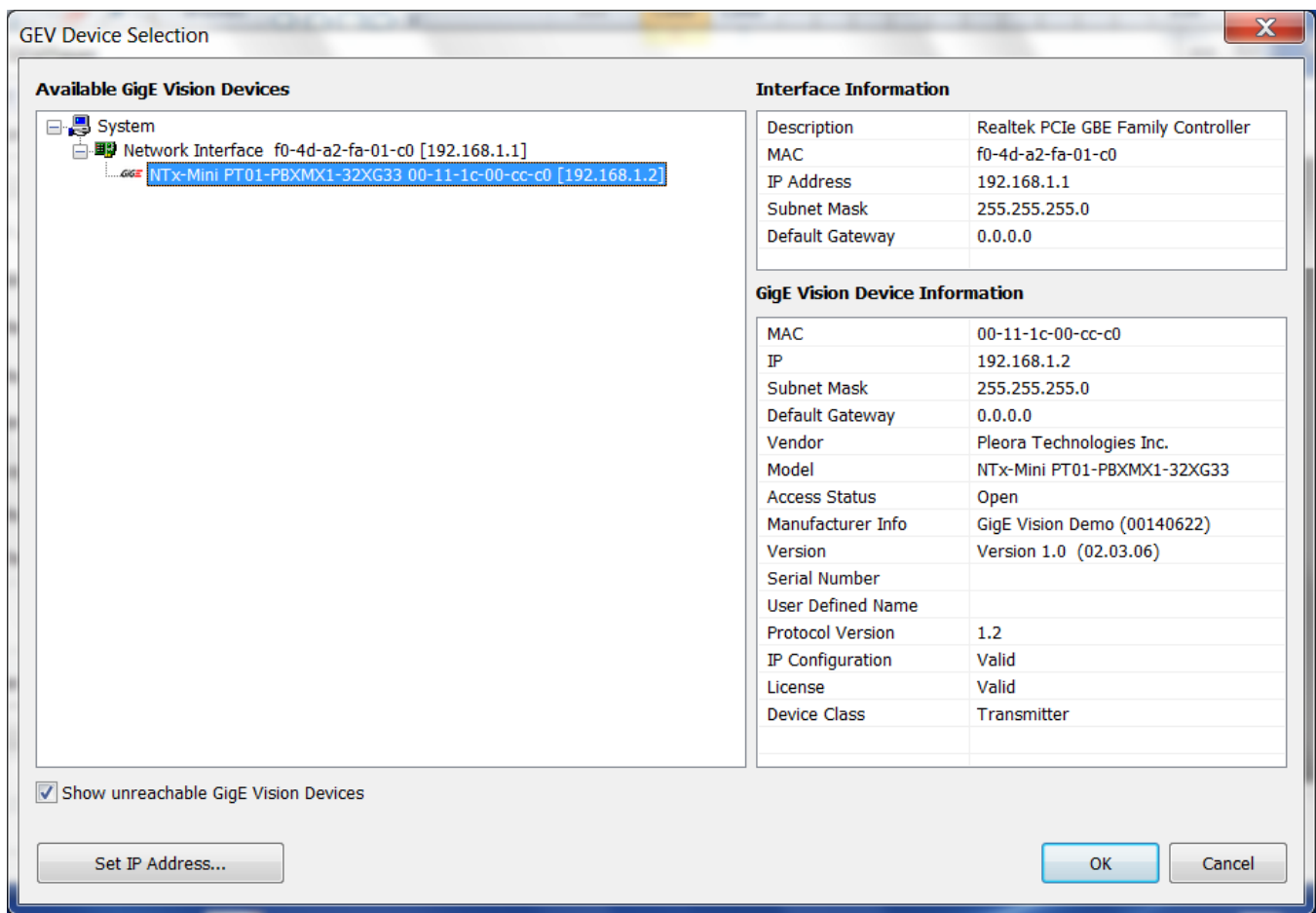
OK Cancel

IP Address: 192 . 168 . 1 . 2

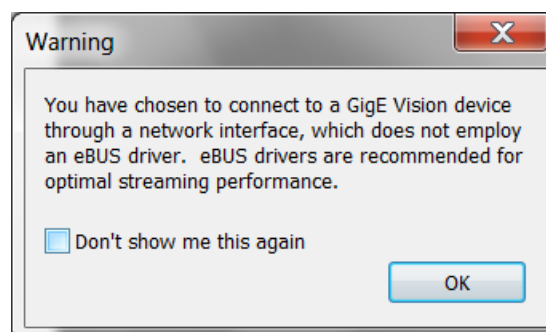
8. Verify the IP Configuration is Valid now.



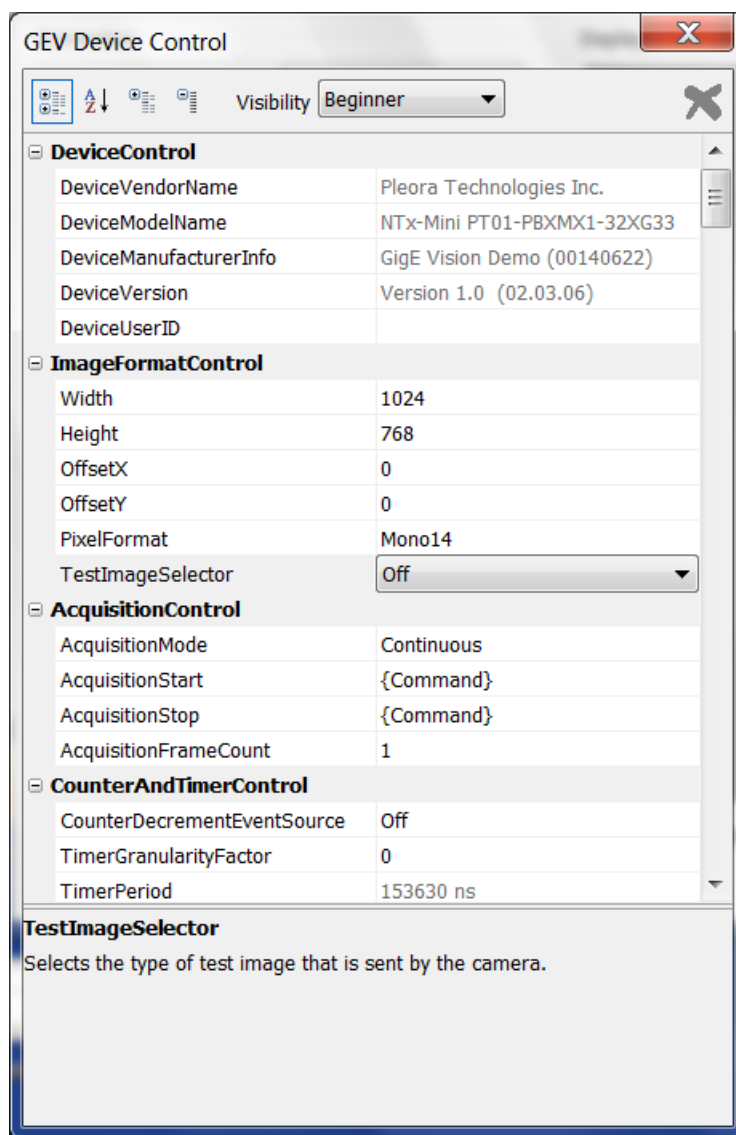
9. Select the GigE interface and click OK.



10. The following warning may be displayed. Click Ok. **Note:** It is recommended to go back and update the Ethernet device driver for improved performance (See Section 5.3).



11. Select the GEV Device control button



12. Setup Width, Height, PixelFormat (Mono14) and TestImageSelector (Off).

13. Click the Play button and observe Error count is 0 and the Stream number of images is incrementing.

8.2.3 LVTTTL interface

Note: The LVTTTL interface is intended to connect to custom designed hardware. The custom designed hardware will provide an interface from which to acquire an image.

Note: The Camera Link LVTTTL Conversion Kit (915325) can be used to image and benchmark the core camera functions and allow for debugging customer interface hardware.

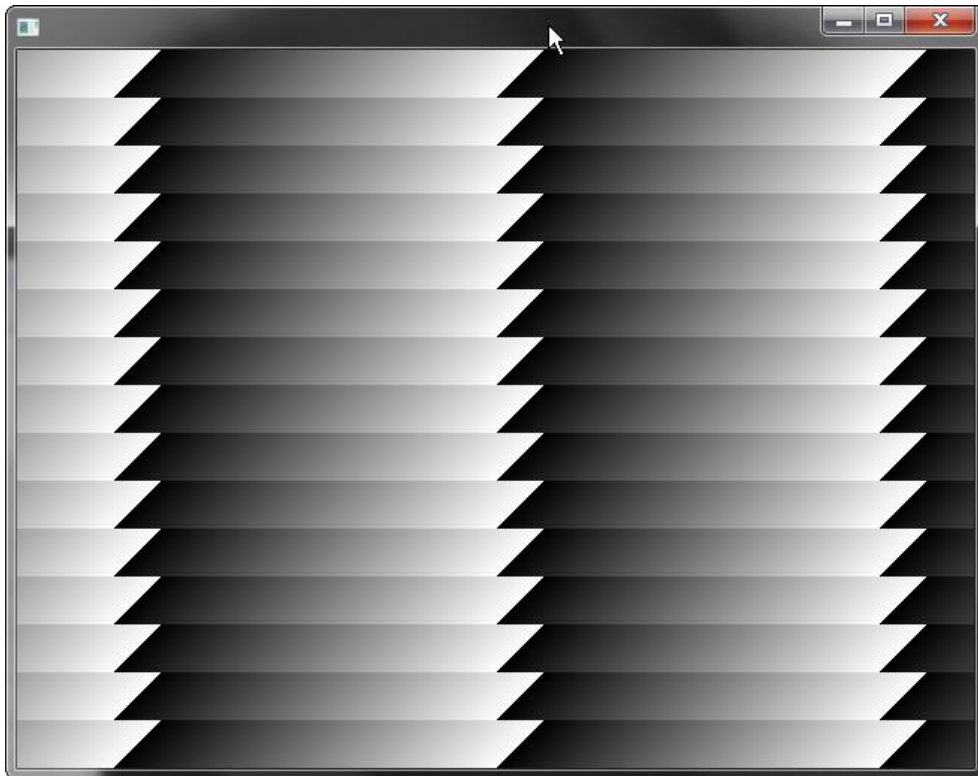
8.3 Troubleshooting your image (For GigE Camera Models)

This section contains images that illustrate the effects of common configuration problems.

If the Gigabit Ethernet interface hardware is configured to generate a test pattern instead of live video from the camera, the displayed images will be a saw-tooth pattern that moves from right to left at a speed that depends on the configured image size.

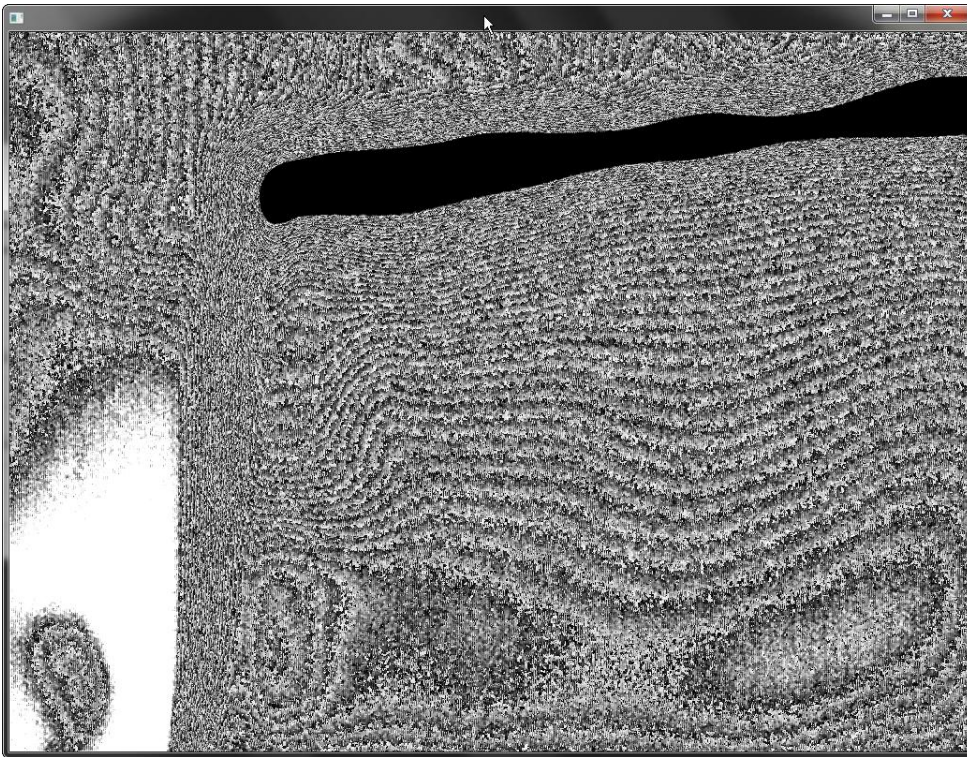
Follow the instructions in Section [8.2.2](#) that describes configuring GEV Player in Unicast mode to resolve this problem.

Note that the camera may default to test pattern mode each time it is powered on.



If the image pixel configuration is not set to 14 bits per pixel, the resulting image will appear excessively noisy, and may show repeating patterns in areas of low contrast.

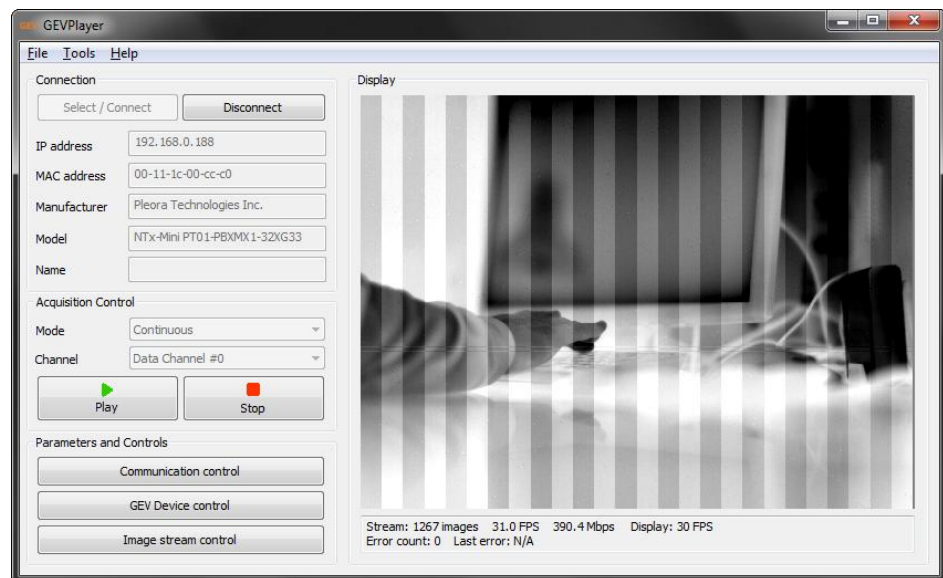
Follow the instructions in Section [8.2.2](#) that describes configuring GEV Player in Unicast mode to resolve this problem.



If the image dimensions are not set correctly, you will see a correctly acquired and displayed image, but the image field of view will not be correct. You will likely see a smaller image area than expected.

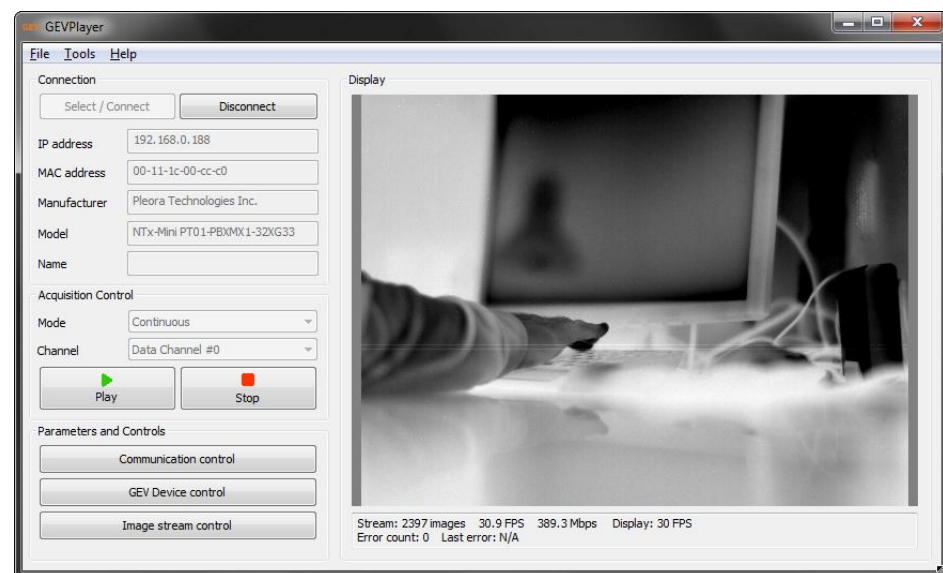
If you see vertical banding of any size in the image, this may simply be the result of a mismatch between the display window size and the screen resolution.

If you see this effect, try resizing the window until the displayed image is clean.



In this example, a dramatic improvement to the image quality was achieved by just changing the window size.

Keep in mind that the display program is attempting to scale a 1024x768 pixel image into a variable sized window. Optimal image quality will be obtained if the display area is an integral multiple of the fundamental image size (e.g. 2x, 1x, 1/2x, 1/4x).



9 Camera configuration and adjustment

9.1 User Control

Camera control is implemented over the serial transmit and receive lines for the Camera Link video interface and packetized for the GigE video interface. The AtomGui sample application provides a user friendly interface for camera control, although individual commands can be arranged to read and write registers directly for testing and debugging purposes.

Note for Camera Link models: The AtomGui supports NI Frame Grabbers. If the user intends on using another manufacturer Frame Grabber and still needs camera control, the serial interface can be changed from the Camera Link serial lines to a separate serial interface requiring a Power Supply with Serial Cable accessory (915288) and a camera setting change. The Power Supply with Serial Cable serial port can be connected to a PC COM port and the AtomGui setup to use the PC COM port. Currently the serial port camera setting is not available to the user and will need to be sent back unless the camera was purchased with this configuration.

Note for GigE models: The AtomGui cannot control the camera at the same time video is acquired. If the user needs to control the camera while acquiring images, the GEV Player software can be setup as a **Data Receiver** with **Multicast** streaming enabled. A description of the workaround is in Section [7.4](#).

9.2 AtomGui application overview

The AtomGui sample application provides a user interface to control the camera. The GUI handles proper command formation and communication with point and click simplicity. Section [10](#) outlines each of the GUI screens while also displaying the read command byte mapping for each control.

9.3 Serial Command Interface overview

The Serial Command Interface utilizes the serial TXD and RXD signals within the video interface to exchange status and configuration information. Allowing lower level functionality, the user can formulate commands and interface with ATOM 1024 control registers directly. The user is then able to control FPGA operations for help in design debugging and production testing. And, to read and write FPGA registers (e.g. current operating/configuration settings) and SDRAM memory (e.g. test patterns, diagnostic frame captures), useful for debugging and manufacturing purposes.

Serial command exchanges are initiated by the external controller, with responses and acknowledgements generated by the ATOM 1024. The ATOM 1024 will not generate any asynchronous serial messages that are not a direct response to an external command or query.

The serial interface settings are 57600 baud, 8 bit data, 1 stop bit, no parity, and no flow control. The ATOM 1024 receives data on the TXD signal and transmits data on the RXD signal. The TXD and RXD serial signals are 3.3V LVTTTL level signals and the TXD signal needs to be set high when the serial interface is idle.

10 Using the ATOM Config

10.1 Connecting & Safe Shutdown

The GUI requires only two files to operate: AtomConfig.exe and AtomSerialCmdLib.dll (both in the same directory).

10.1.1 Connect to ATOM Config

1. Launch AtomGui from your computer by clicking the AtomGui.exe application file.
2. Select the method of connection via the Interface pull-down menu.

Note: Depending on the number of Camera Link frame grabbers installed in the PC or if the frame grabber supports dual Base configuration, the Serial Port selection may be CAMERALINK0 or CAMERALINK1. There may be multiple cameras connected on a network that are discovered.

3. Click Connect to open camera connection.
4. Click Disconnect to close camera connection.

Atom Configuration GUI version 1.1.1.0

Info Video Image NUC Lens

System Identification:

Module Identifier	2	DET CCA	1
Serial Number	46507	XDI CCA	1
Firmware Rev	1.1.40	PWR CCA	1
		Detector	1
		Mechanical	1

Hardware Revisions:

Status flags:

<input checked="" type="checkbox"/> Image ready	<input type="checkbox"/> DAC failed
<input type="checkbox"/> VTEMP out of range	<input type="checkbox"/> RAM BIST failed
<input type="checkbox"/> Shutter closed	<input type="checkbox"/> Flash BIST failed
<input type="checkbox"/> Bad pixel overflow	<input type="checkbox"/> Shutter failed
	<input type="checkbox"/> Input voltage out of range
	<input type="checkbox"/> Detector voltage out of range

VTEMP: 11886

Refresh Self Test

Interface: 192.168.0.182 / 00-11-1c-00-f7-ae Refresh

☐ Multicast Address: 239 192 1 183 Port: 1042

Disconnect Safe Shutdown

Library Version: 9.1.9.0 Last cmd: GetFpaTemp, Success

Atom Configuration GUI version 1.1.1.0

Info Video Image NUC Lens

System Identification:

Module Identifier		DET CCA	
Serial Number		XDI CCA	
Firmware Rev		PWR CCA	
		Detector	
		Mechanical	

Hardware Revisions:

Status flags:

<input type="checkbox"/> Image ready	<input type="checkbox"/> DAC failed
<input type="checkbox"/> VTEMP out of range	<input type="checkbox"/> RAM BIST failed
<input type="checkbox"/> Shutter closed	<input type="checkbox"/> Flash BIST failed
<input type="checkbox"/> Bad pixel overflow	<input type="checkbox"/> Shutter failed
	<input type="checkbox"/> Input voltage out of range
	<input type="checkbox"/> Detector voltage out of range

VTEMP:

Refresh Self Test

Interface: CAMERALINK0 Refresh

Co COM3

Library Ve 192.168.0.172 / 00-11-1c-00-89-81

192.168.0.183 / 00-11-1c-00-f5-32

192.168.0.182 / 00-11-1c-00-f7-ae

Shutdown

10.1.2 Safe Shutdown

Before unplugging your camera, be sure to click the Safe Shutdown button. The Safe Shutdown button will disable the detector and close the shutter before you power down the camera. Both actions help preserve camera and detector life.

10.2 Info Tab

The Info Tab displays hardware & firmware identification numbers, camera status, and the detector temperature (VTEMP).

The screenshot shows the 'Atom Configuration GUI' window, version 1.1.1.0, with the 'Info' tab selected. The window is divided into several sections:

- System Identification:**
 - Module Identifier: 2
 - Serial Number: 46507
 - Firmware Rev: 1.1.40
- Hardware Revisions:**
 - DET CCA: 1
 - XDI CCA: 1
 - PWR CCA: 1
 - Detector: 1
 - Mechanical: 1
- Status flags:**
 - ☒ Image ready
 - ☐ VTEMP out of range
 - ☐ Shutter closed
 - ☐ Bad pixel overflow
- Fault indicators:**
 - ☐ DAC failed
 - ☐ RAM BIST failed
 - ☐ Flash BIST failed
 - ☐ Shutter failed
 - ☐ Input voltage out of range
 - ☐ Detector voltage out of range
- VTEMP:** 11916

At the bottom of the main content area are two buttons: 'Refresh' and 'Self Test'.

Below the main content area is a network configuration section:

- Interface: 192.168.0.182 / 00-11-1c-00f7-ae (with a 'Refresh' button)
- ☒ Multicast
- Address: 239 (dropdown), 192 (dropdown), 1 (dropdown), 182 (dropdown)
- Port: 1042 (dropdown)
- Buttons: 'Disconnect' and 'Safe Shutdown'

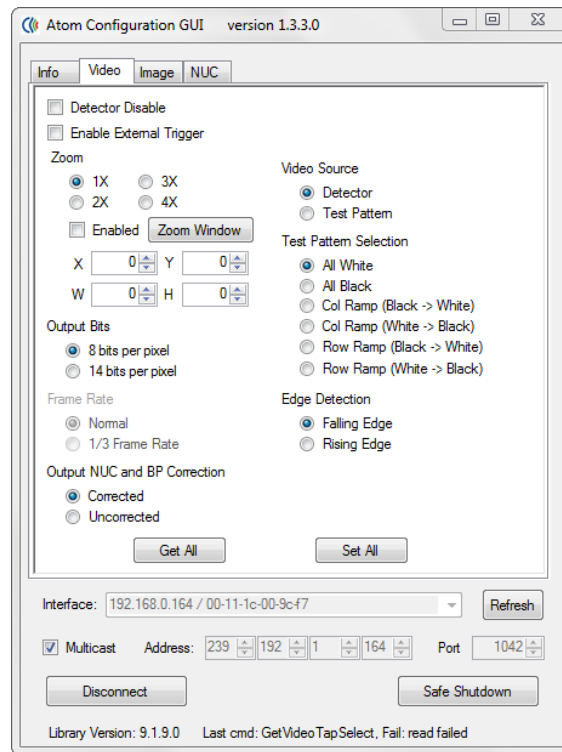
At the very bottom, it shows 'Library Version: 9.1.9.0' and 'Last cmd: GetFpaTemp, Success'.

Refresh the Status, Fault Indicators, and VTEMP values by pressing the **Refresh** button.

Initiate a self-test operation by pressing the “**Self Test**” button. This operation can take several minutes during which the “Image ready” box will not be checked when you refresh the status information. When the test is complete, “Image ready” will return to the checked state, and any error conditions detected during the test will be reported among the “Fault indicators.”

10.3 Video Tab

The Video Tab is used to set the detector window format. The Video Tab can also configure the output video display resolution, output video zoom, output video data resolution, and enable video image correction. The Video Tab can also select from a live image and several test patterns.



10.3.1 Detector Disable

Selecting this checkbox will disable the detector. This is a function that is applied when using the safe shutdown button in order to preserve the detector.

10.3.2 External Sync & Edge Detection

The External Sync Tab is used to control the camera from an external timing source. The primary purpose is to allow the User to control and synchronize the Frame Rate to an external clock and secondarily to align the start of frame integration activity with external events. Full camera performance is achieved at rates approximately equal to the 30Hz frame rate used to calibrate the camera at manufacture time.

Use of the External Sync feature is flexible and can be used to slow the camera down to very low frame rates (e.g. sub 1Hz), with associated compromises in spatial noise performance and speed of 1NUC operations.

The balance of this section describes the signal connectivity, control and timing issues to use the External Sync feature.

The External Sync signal is driven from different access points depending on the I/O configuration. The signal is input is as follows:

- In Camera Link camera models, the signal is accessed from the CC1 control line and Pair8 signals on Camera Link interface). Pair8 signals are connected as follows:
 - Camera end Pin 22 (PAIR8+) and Pin 9 (PAIR8-)

- Frame grabber Pin 5 (PAIR8+) and Pin 18 (PAIR8-)
- In LVTTTL camera models the signal is accessed from J1 pin 13.
- The External Sync signal exists in Gigabit Ethernet camera models and can be accessed via the Pleora SDK as the same CC1 control line described in the Camera Link configurations. However, software control of this signal is impractical for precision timing in most host controlled situations and as a result this configuration is not formally supported. Some useful results may be obtained with specialized host hardware and/or operation at low frame rates, and the determination of successful operation is left to the user.

Figure 2a: External Sync Edge Triggering Timing Diagram with Zoom disabled

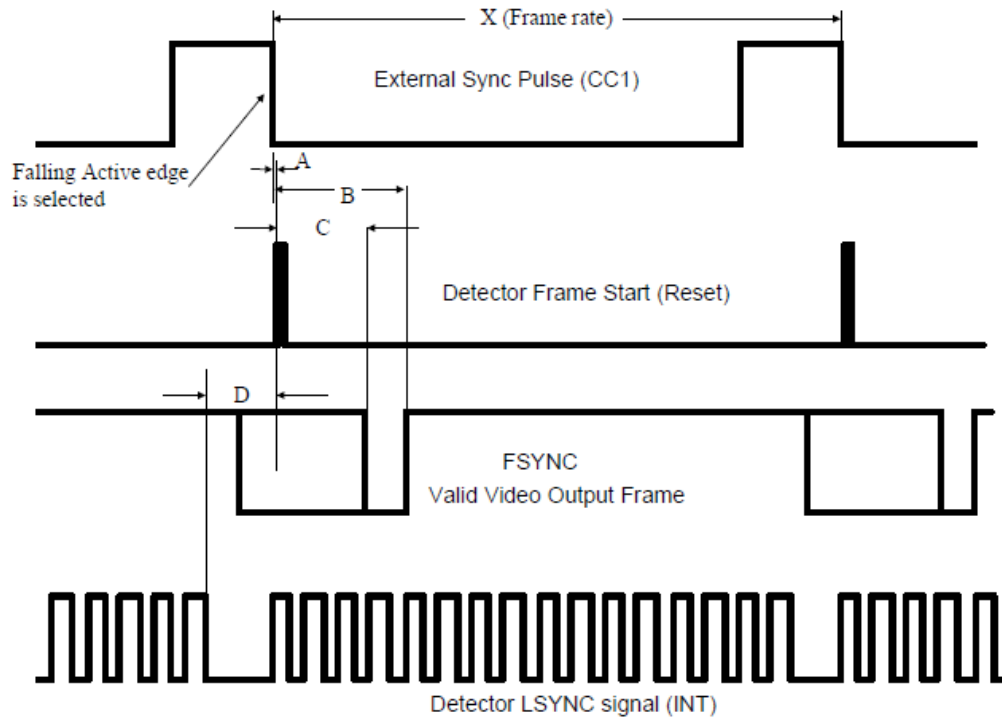


Table 7: External Sync Timing Parameters

Symbol	Parameter	Min	Max	units
X	Time between frames	33.332	34.130 (Note 1)	ms
Frame Rate	1/X	29 (Note 1)	30.01	HZ
A	Active Sync edge to Detector Frame Start	520	600	ns
B	Active Reset pulse edge to start of Output Video Frame Valid	127.75	408.9	μs
C	Reset pulse to End of Output Video Frame Valid	-163.55	385.4	μs
D	End of last line Integration to Reset pulse	183	238.60	μs

Note 1: The camera will perform as calibrated within the specified Min to Max frame rate range. Operation higher than this range cannot occur; the rate is capped at the maximum 30.01Hz. Lower operation is possible with caveats of increased spatial noise.

The NUC that limits spatial noise depends on the thermal conditions around the pixels. These conditions include not only camera ambient temperature, but also effects such as the self heating generated by bias current applied during the integration time as well as the cooling that takes place in the interval between integration cycles. While NUC operations compensate for ambient temperature changes, this self heating and cooling is directly influenced by variations in frame rate and is not automatically compensated for in NUC adjustments. As a result, the External Sync control operated at rates below the specification will produce an image, but with increasing gain and offset errors. Offset error can be compensated by 1NUC operations when performed specifically at the Frame Rate driven by the External Sync signal. Failure to 1NUC at the current Frame Rate will result in poor imaging when operated outside the limits.

During a 1NUC operation, the camera accumulates video frames for each pixel's offset computation. When performed at reduced Frame Rate, this operation takes proportionally longer to complete and may look like a non-responsive system at really low (e.g. < 0.5HZ) external clock rates.

In applications that require minimal system delay, note that enabling the Digital Zoom function adds one Frame delay between Detector and output Video.

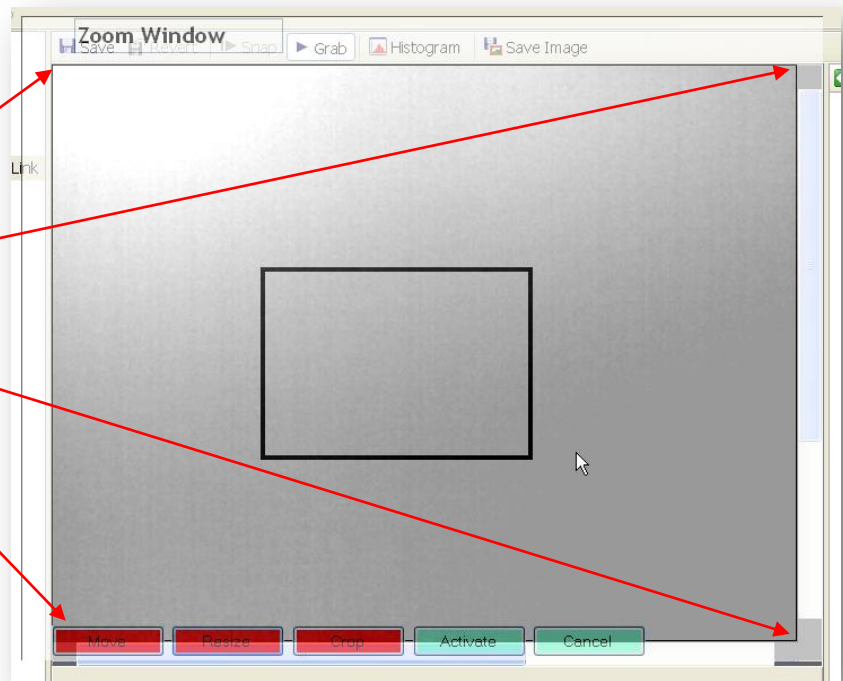
10.3.3 Select Image Zoom

From the Video tab, click the bullet next to desired Zoom (1X, 2X, 3X, or 4X). The default value is 1X Zoom.

10.3.4 Zoom Window

The Zoom Window is, by default, turned off. To begin using the Zoom Window, you must align all the edges of the Zoom Window frame to all four corners of the live image (as displayed by the four arrows). Aligning the corners will ensure the accuracy of your crop box.

All four corners aligned



First, click **Move** and drag the Zoom frame to align the top left corner of the box. Click **Resize**, then click and drag the frame box to align the bottom right corner with the live image. Once your box is set, click **Crop** to select the area you would like to zoom to. To adjust the crop area, simply click **Crop** again and re-select the area. Once you are satisfied, click **Activate** to initiate the zoom. If you would like to cancel what you have done with the Zoom Window open, click **Cancel**.

Once your zoom area has been set, you may use the up and down arrows next to the text boxes to change the values in order to modify your zoom area. The X and Y values signify the origin of the zoom area, and the W and H signify the width and height of the zoom area, respectively. You may also toggle the zoom window on and off using the “Enabled” check box.

10.3.5 Lens Selection (only for customers purchasing multiple lenses)

This field is only present if your configuration file defines manual lens choices. If you have purchased more than one lens to connect to your ATOM 1024 camera, you would select which lens you are operating with from the dropdown menu.

In the example displayed to the right, a customer has purchased three different lenses; a 13mm, 25mm, and 50mm. When switching lenses, simply select the appropriate lens from the drop-down menu and the appropriate NUC table will be applied.

10.3.6 Setting Output Video Dynamic Range (8-bit or 14-bit)

From the Video tab, click the bullet next to 8 bits per pixel or 14 bits per pixel. The camera will default to be 8 bits per pixel.

Note: When operating in 8-bit mode, the output bits will occupy the most significant bit positions of the parallel output channel, with the unused bit positions set to zero values.

10.3.7 Setting Frame Rate

From the Video tab, click the bullet next to Normal or 1/3 Frame Rate. The Normal Frame Rate is 30hz.

Note: Cameras are normally shipped as 30hz default. Special orders can modify factory defaults. The 10hz option can be used in any interface; however the setting is intended to allow multiple cameras on a single GigE network segment.

10.3.8 Setting Output Correction (Corrected or Uncorrected)

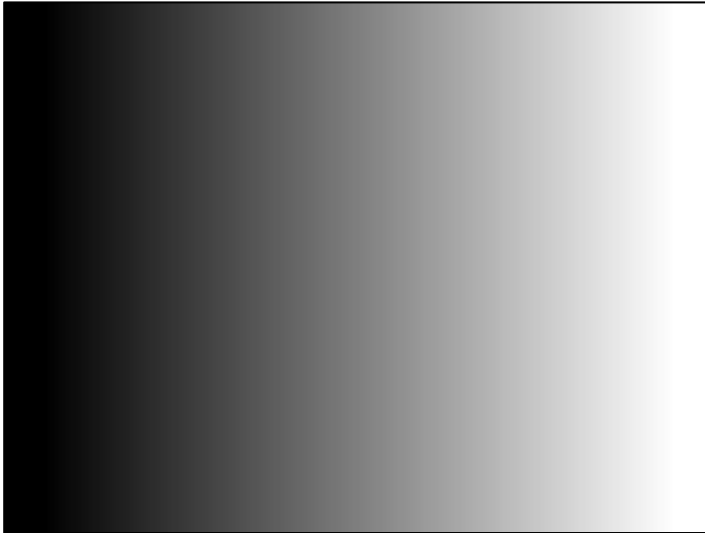
From the Video tab, click the bullet next to Corrected or Uncorrected to enable or disable 1NUC and 2NUC processing. The camera’s default displays the Corrected image.

Note: When operating in 14-bit mode, the output image data will be selectable between uncorrected raw full amplitude resolution, and non-uniformity corrected. In 14 bit mode, palette, gain level adjustments, and zoom are not applied to the output image. In 8-bit mode, the output image data is always gain and level compensated.

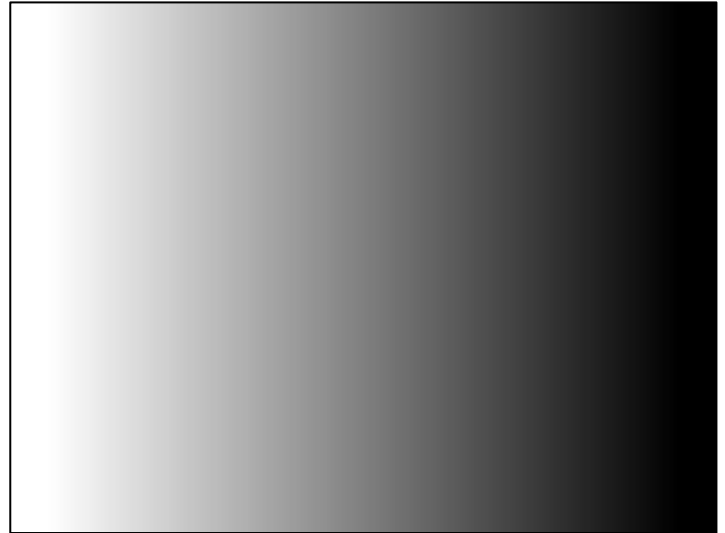
10.3.9 Video Source & Test Pattern Selection

From the Video tab, click the bullet next to Test Pattern to change your video source from the Detector to the Test Pattern. There are six Test Patterns you may choose from: All White, All Black, Col Ramp (Black -> White), Col Ramp (White -> Black), Row Ramp (Black -> White), and Row Ramp (White -> Black).

Note: The test patterns are labeled as they appear for a White Hot scene. If you have selected Black Hot from the Image tab, each test pattern will be reversed.



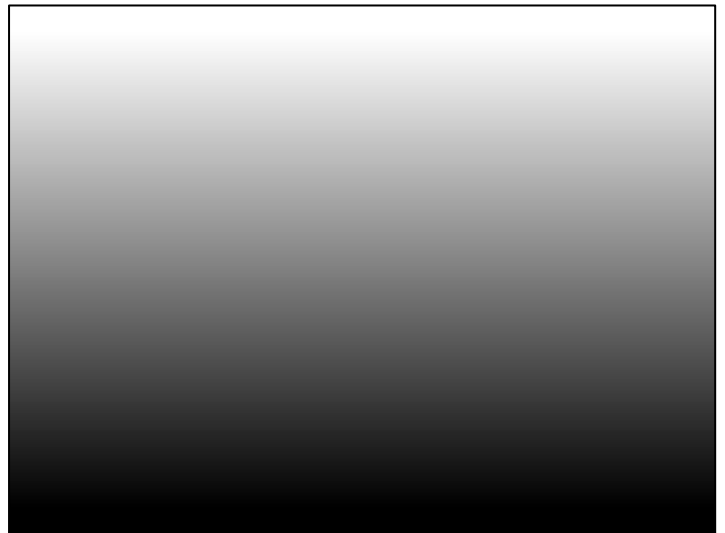
Col Ramp (Black -> White)



Col Ramp (White -> Black)



Row Ramp (Black -> White)



Row Ramp (White -> Black)

10.4 Image Tab

The Image Tab can set the palette, auto or manual gain and level, and AGC cutoff thresholds.

Palette – The Polarity settings configures the video as White-Hot or Black-Hot. The camera defaults to White-Hot.

Gain Mode – The gain mode defaults to Automatic Gain.

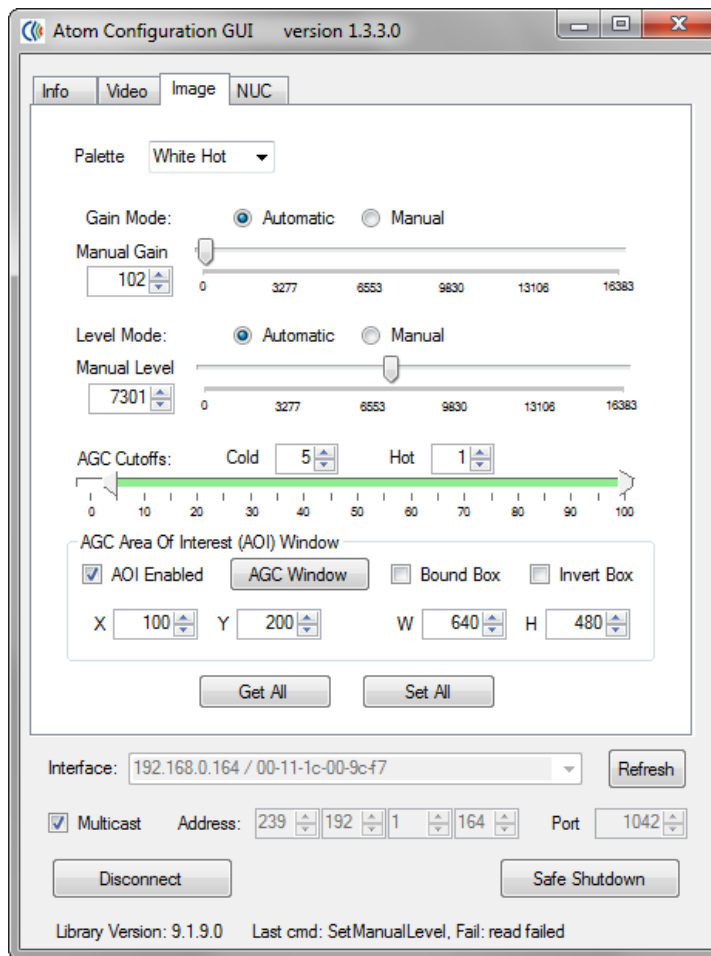
Manual Gain – The Gain setting allows manual **gain span** control of the digital outputs, similar to image contrast with visible cameras.

Level Mode – The level mode defaults to Automatic Level.

Manual Level – The Level setting allows manual **gain level** control of the digital outputs, similar to image brightness with visible cameras.

AGC Cold Cutoff – The AGC Cold Cutoff specifies the percentage of the coldest pixels to be excluded from the AGC calculation.

AGC Hot Cutoff – The AGC Hot Cutoff specifies the percentage of the hottest pixels to be excluded from the AGC calculation.



10.4.1 Select Palette (White-Hot, Black-Hot)

From the Image tab, select White-Hot or Black-Hot from the Palette pull-down menu.

10.4.2 Setting Manual Gain and Level settings

1. From the Image tab, click the bullet next to Manual for Gain Mode and Level Mode.
2. Edit the value for Manual Gain and Manual Level in the up/down counter box or click and drag the slider.

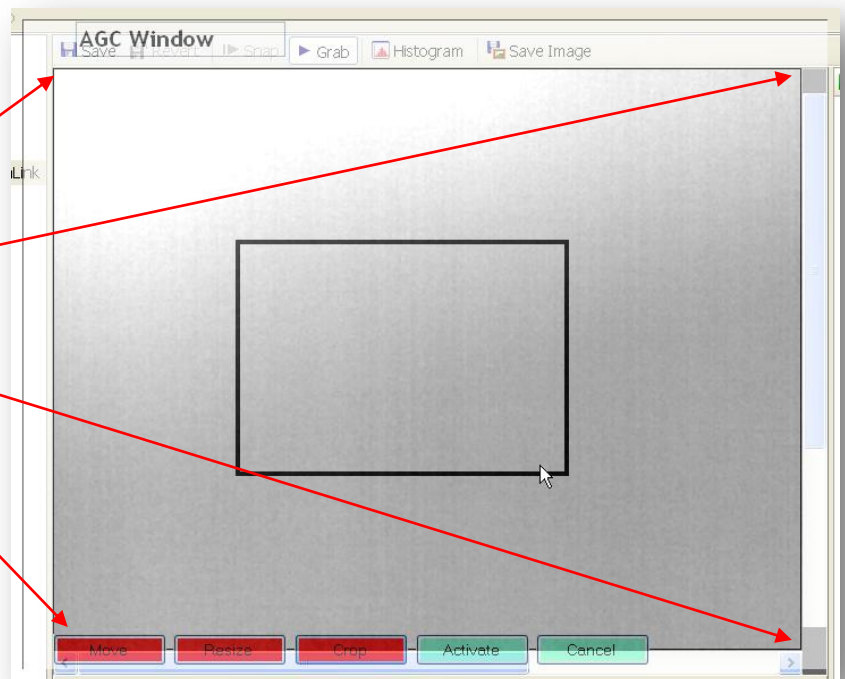
10.4.3 Setting AGC cutoffs

From the Image tab, edit the value for Cold & Hot AGC Cutoffs in the up/down boxes or click and drag the sliders.

10.4.4 AGC (Automatic Gain Control) Window

The AGC Window is, by default, turned off. To begin using the AGC Window, you must align all the edges of the AGC Window frame to all four corners of the live image (as displayed by the four arrows). Aligning the corners will ensure the accuracy of your crop box.

All four
corners
aligned



First, click **Move** and drag the AGC frame to align the top left corner of the box. Click **Resize**, then click and drag the frame box to align the bottom right corner with the live image. Once your box is set, click **Crop** to select the area you would like AGC to be applied to. To adjust the crop area, simply click **Crop** again and re-select the area. Once you are satisfied, click **Activate** to initiate the AGC. If you would like to cancel what you have done with the AGC Window open, click **Cancel**.

Once your AGC area has been set, you may use the up and down arrows next to the text boxes to change the values in order to modify your AGC area. The X and Y values signify the origin of the AGC area, and the W and H signify the width and height of the AGC area, respectively. You may also toggle the AGC Window on and off using the "AOI Enabled" check box.

Bound Box: If selected, this will draw a box around your AGC Area of Interest

Invert Box: If selected, this will invert polarity of the pixels inside the Bound Box.

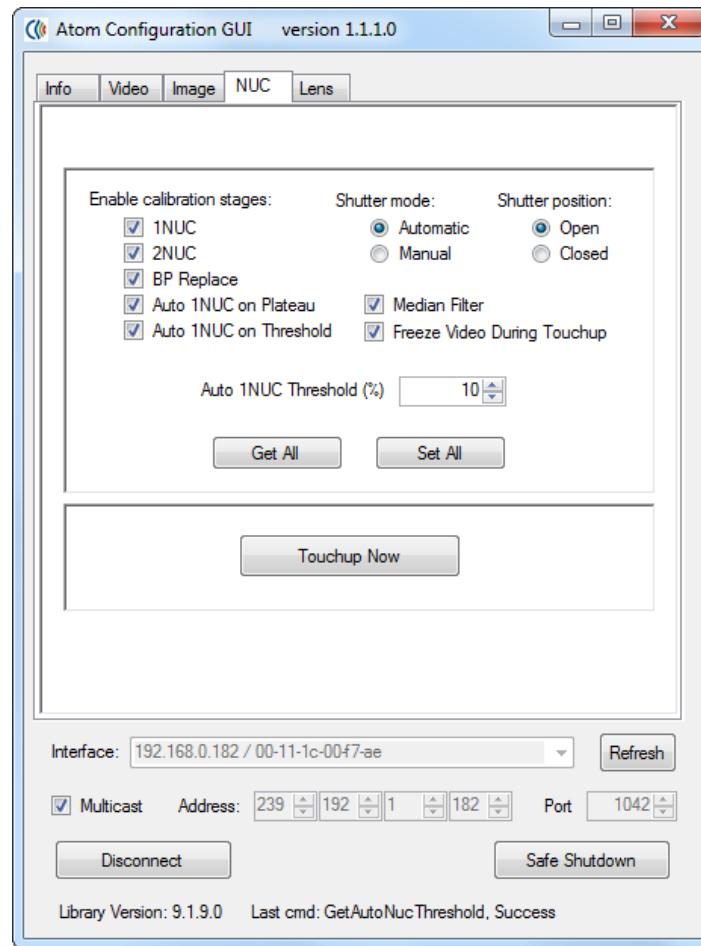
AGC Area Of Interest (AOI) Window

<input checked="" type="checkbox"/> AOI Enabled	<input type="checkbox"/> AGC Window	<input type="checkbox"/> Bound Box	<input type="checkbox"/> Invert Box
X <input type="text" value="290"/>	Y <input type="text" value="272"/>	W <input type="text" value="385"/>	H <input type="text" value="267"/>

10.5 NUC Tab

The NUC Tab is used to initiate a Touchup (1 pt. NUC), and to enable or disable image processing including video noise reduction. The NUC tab also allows selection of the Auto 1NUC Threshold percentage which if the ambient temperature of the current plateau has changed by more than this percentage, a Touchup is automatically performed.

By default, the shutter mode is set to Automatic. By default, the **Median Filter** and **Freeze Video During Touchup** will be on.



10.5.1 Initiating a Touchup (against the shutter)

1. From the NUC tab, click the “Touchup Now” button.
2. Observe an audible sound of the shutter being closed and opened.

10.5.2 Initiating a Touchup (through Lens)

1. From the NUC tab, change the Shutter Mode from Automatic to Manual by clicking the bullet next to Manual for Shutter Mode.
2. Place a uniform temperature object in front of the lens.
3. Click the “Touchup Now” button.
4. Remove the uniform object and verify the image.

10.6 Lens Tab (only for CZ lens cameras)

The Lens Tab is used for zoom and focus control with Motorized Continuous Zoom Lens.

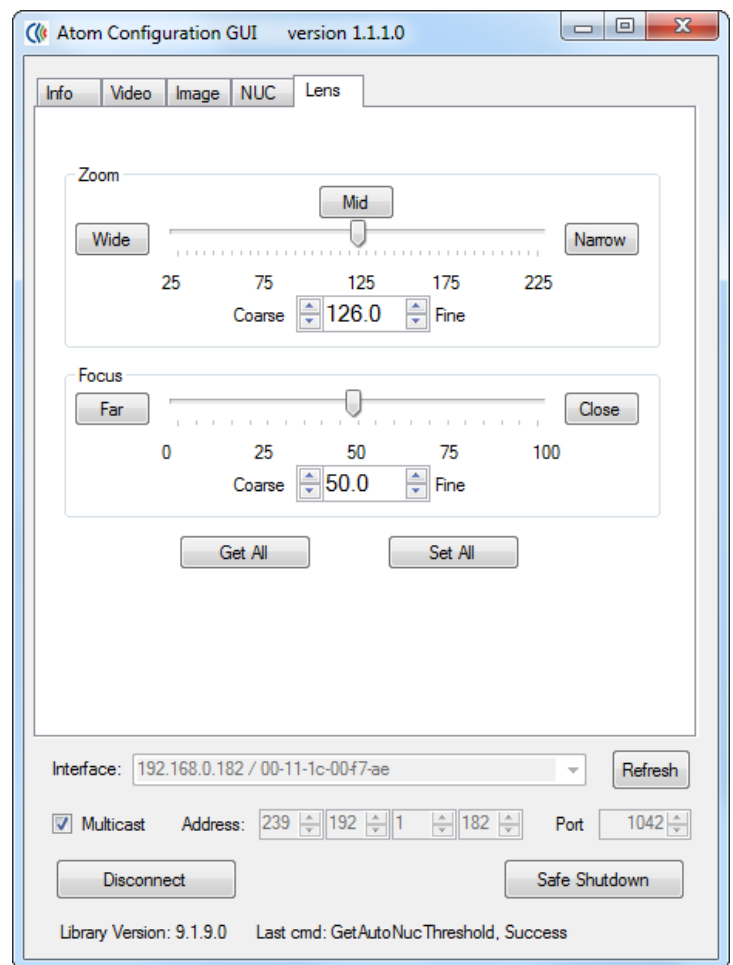
The Zoom and Focus may be adjusted different ways:

- Clicking the Wide, Mid, or Narrow (or Far & Close) buttons
- Using the up/down Coarse and Fine buttons
- Clicking along the zoom or focus bar
- Clicking and dragging the cursor across the bar
- Manually entering in a value in the text box

Note 1: The changes to the Focus and Zoom will be immediately reflected. “Set All” is not necessary to make changes.

Note 2: The NUC tables that are appropriate for selected ZOOM position are automatically selected and loaded when zoom level is changed.

Note 3: The camera will maintain proper Focus position for selected Zoom level until Focus position is manually changed by the user.



10.7 Default Values

This table shows the power-on defaults for all user controllable settings. The Atom camera will return to these configuration settings every time it is powered on.

Tab	Field Name	Field Default
Video	Detector Disable	Detector enabled (unchecked)
	Enable External Trigger	Disabled (unchecked)
	Zoom	1X
	Output Bits	8 bits per pixel
	Frame Rate	Normal
	Output NUC and BP Correction	Corrected
	Video Source	Detector
	Test Pattern Selection	All White
	Edge Detection	Falling Edge
Image	Palette	White Hot *
	Gain Mode	Automatic
	Level Mode	Automatic
	AGC Cutoff – Cold	5
	AGC Cutoff – Hot	1
NUC	Enable 1NUC	Enabled
	Enable 2NUC	Enabled
	Enable BP Replace	Enabled
	Enable Auto 1NUC on Plateau	Enabled
	Enable Auto 1NUC on Threshold	Enabled
	Shutter mode	Automatic
	Shutter position	Open
	Median Filter	Enabled *
	Freeze Video During Touchup	Enabled
	Auto 1NUC Threshold	10%

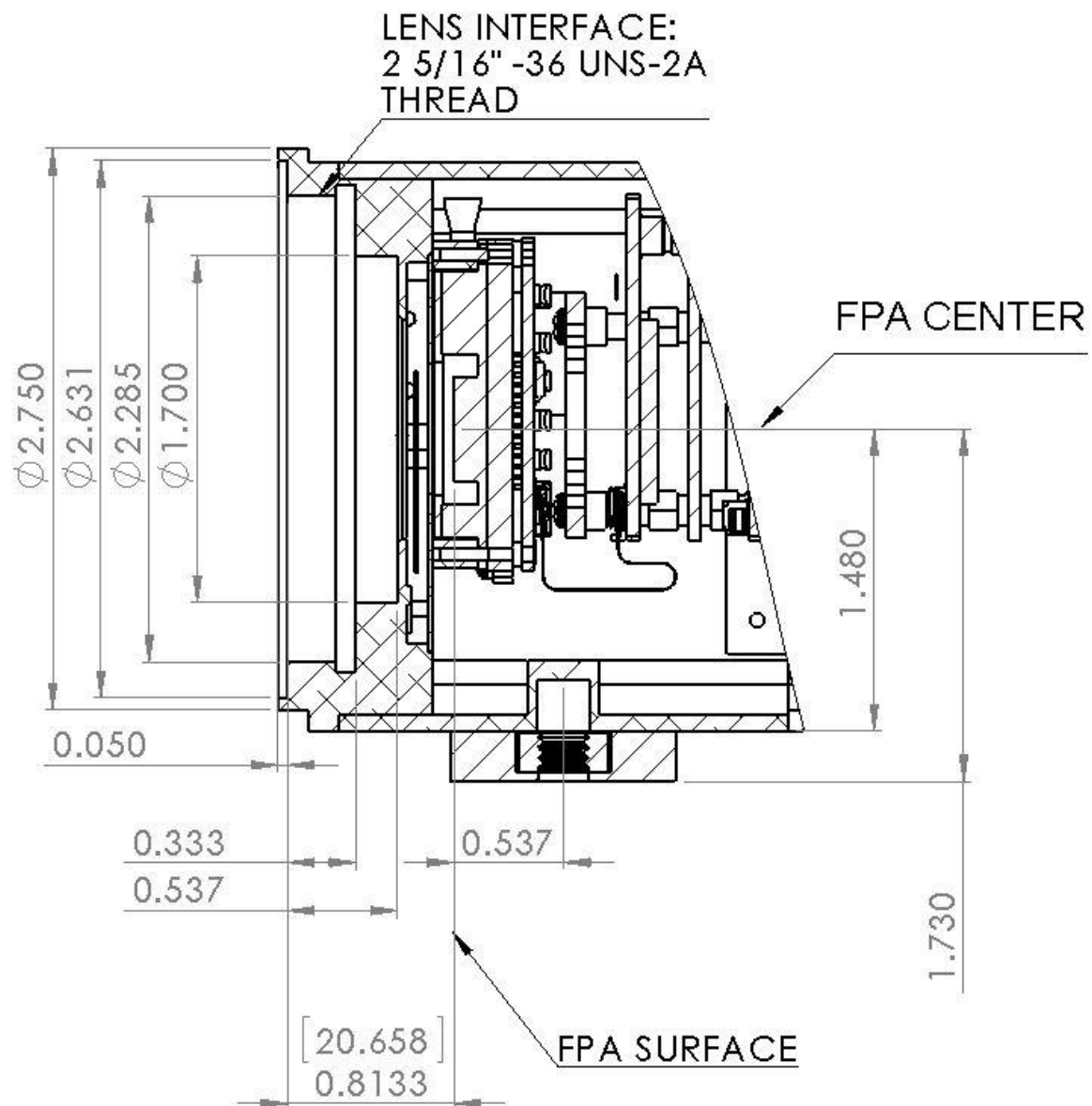
* Factory configured: some cameras may have different default setting

11 Physical Dimensions Drawings

This section contains the physical dimension drawings for each permutation of the ATOM 1024 camera.

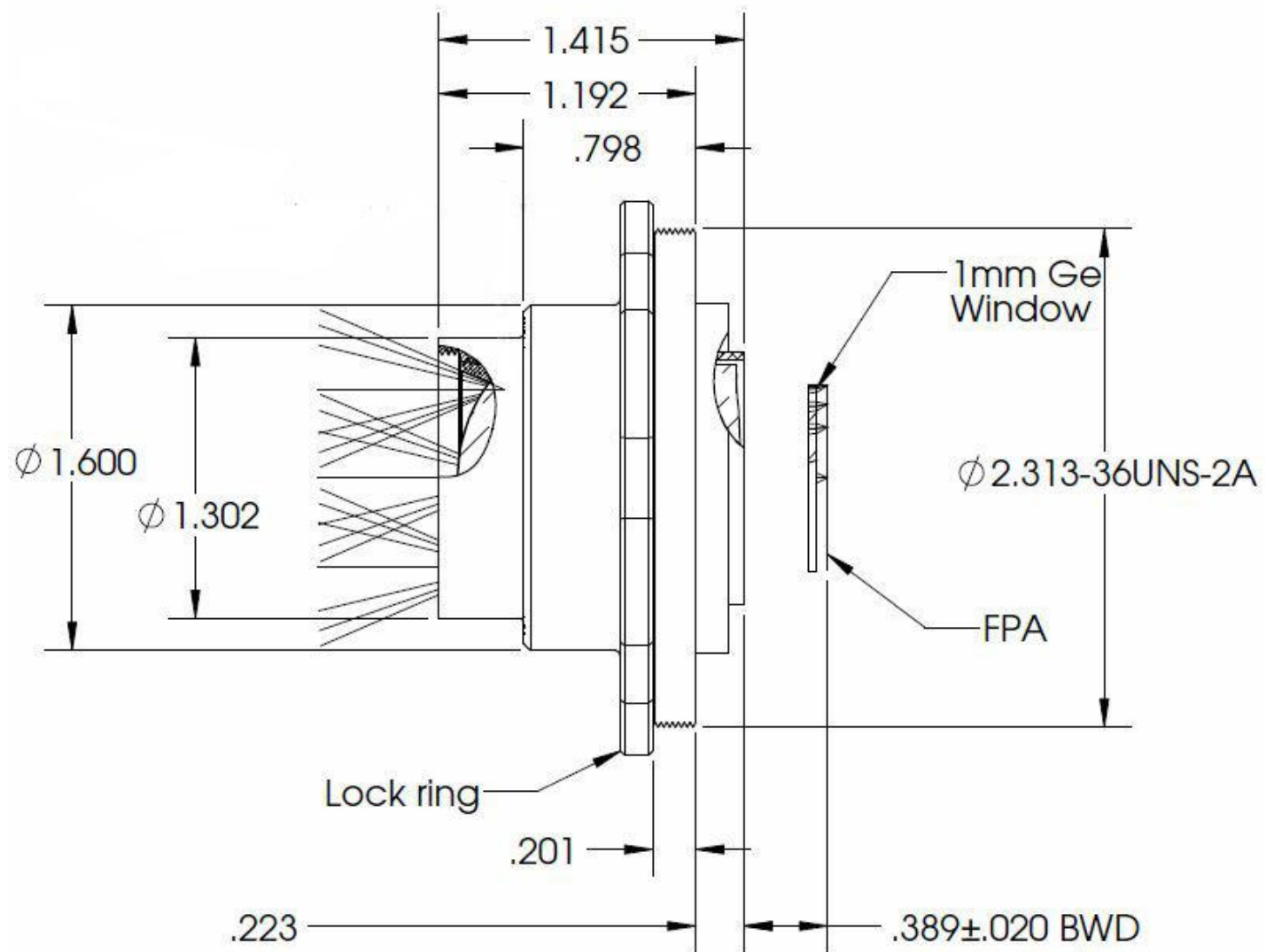
11.1 Standard lens Dimensions

11.1.1 Universal Lens Mount Interface

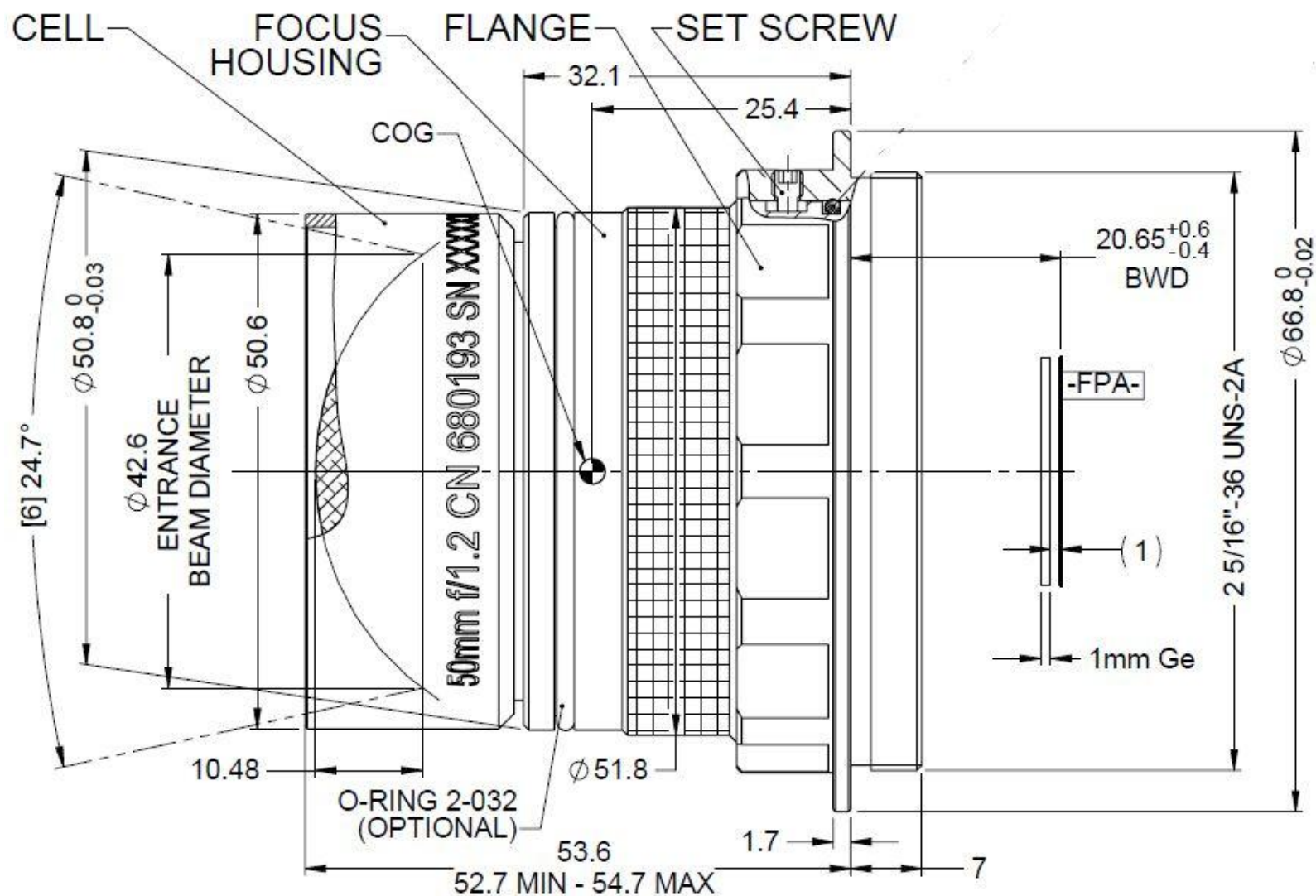




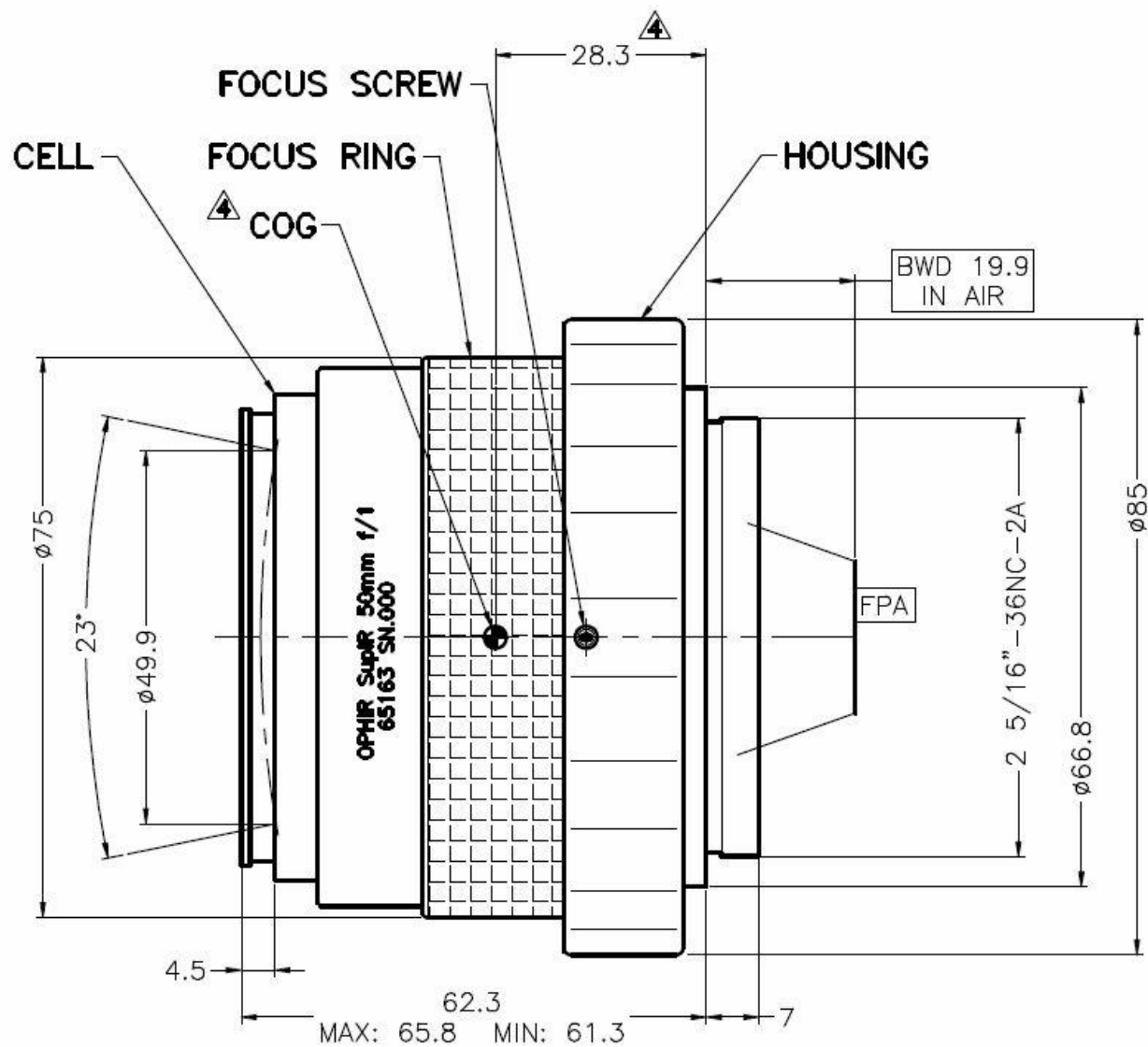
11.1.3 25mm (f1.2) Athermal Fixed Focus Lens Dimensions



11.1.4 50mm (f1.2) Athermal Fixed Focus Lens Dimensions

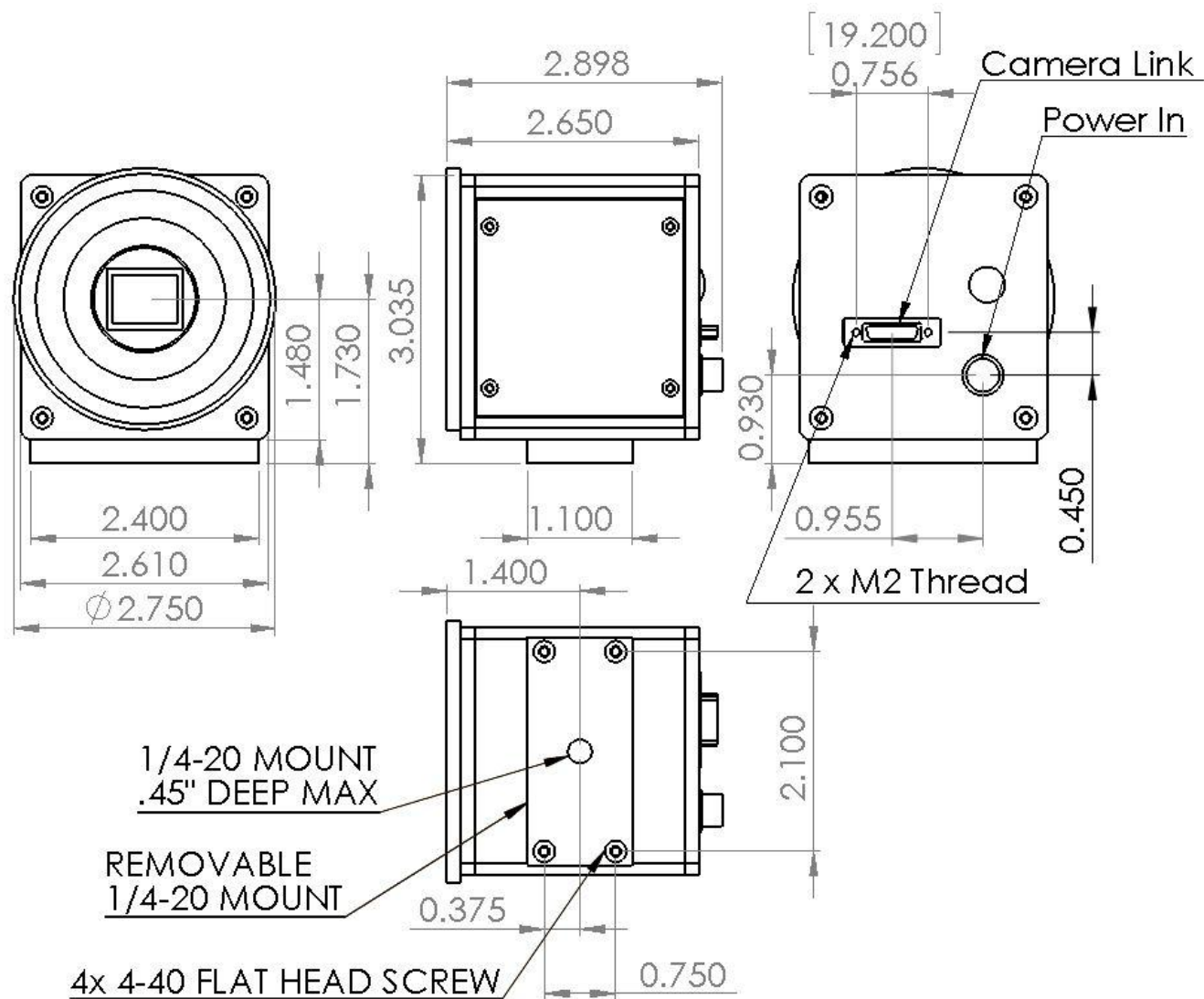


11.1.5 50mm (f1.0) Manual Focus Lens Dimensions



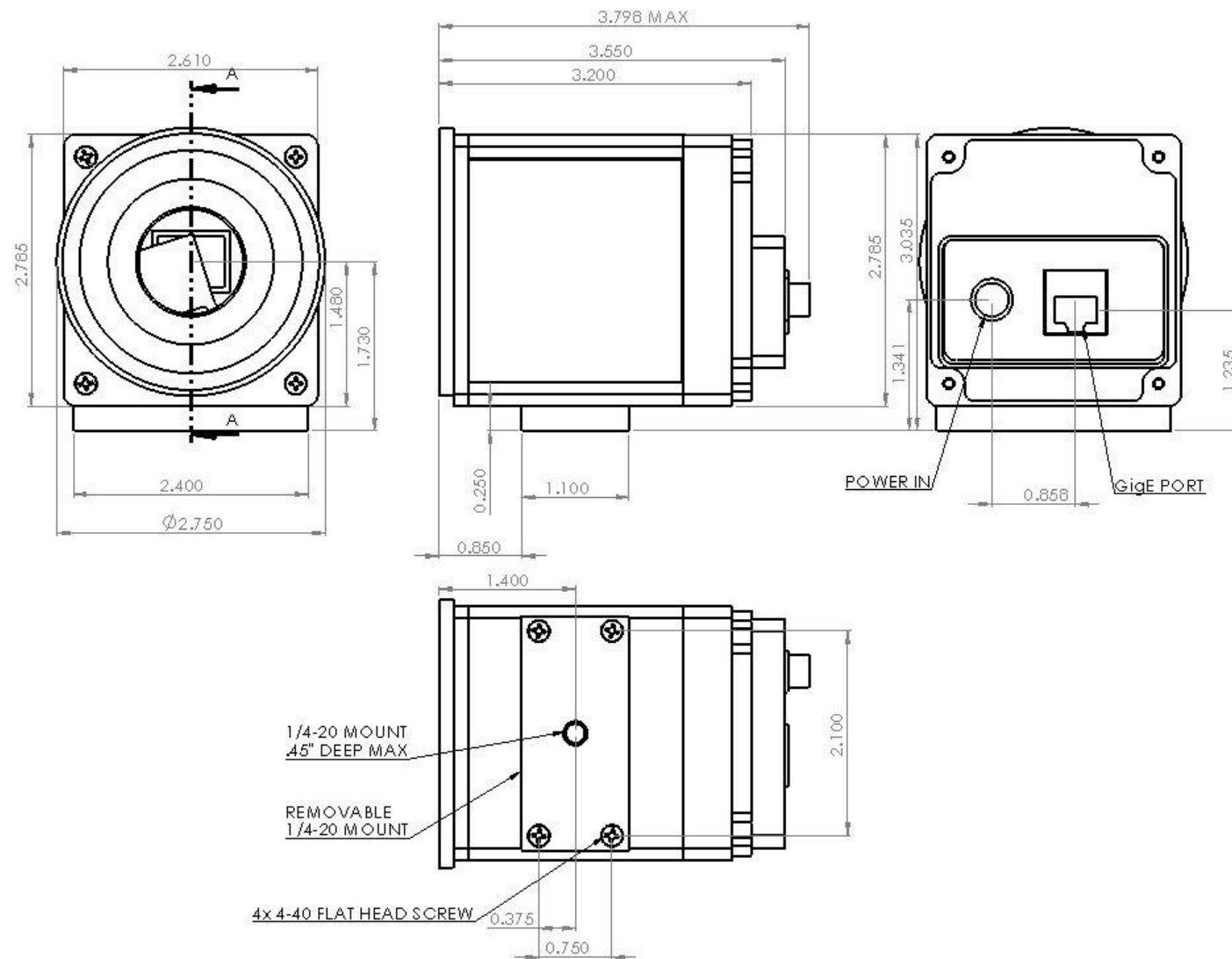
11.2 ATOM 1024-20 C Model Physical Dimensions

Note: Drawing displays the model without a lens mounted.



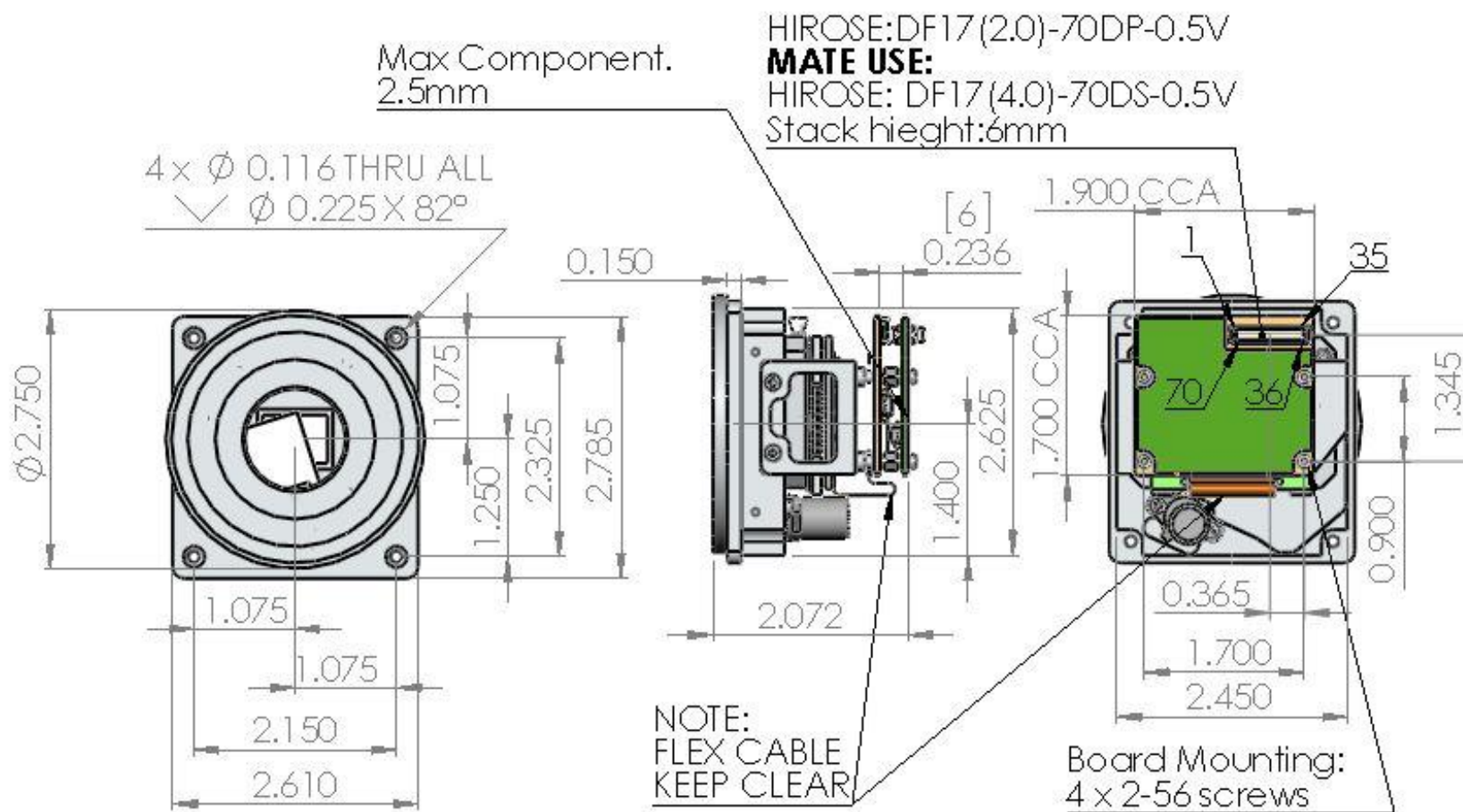
11.3

Note: Drawing displays the model without a lens mounted.



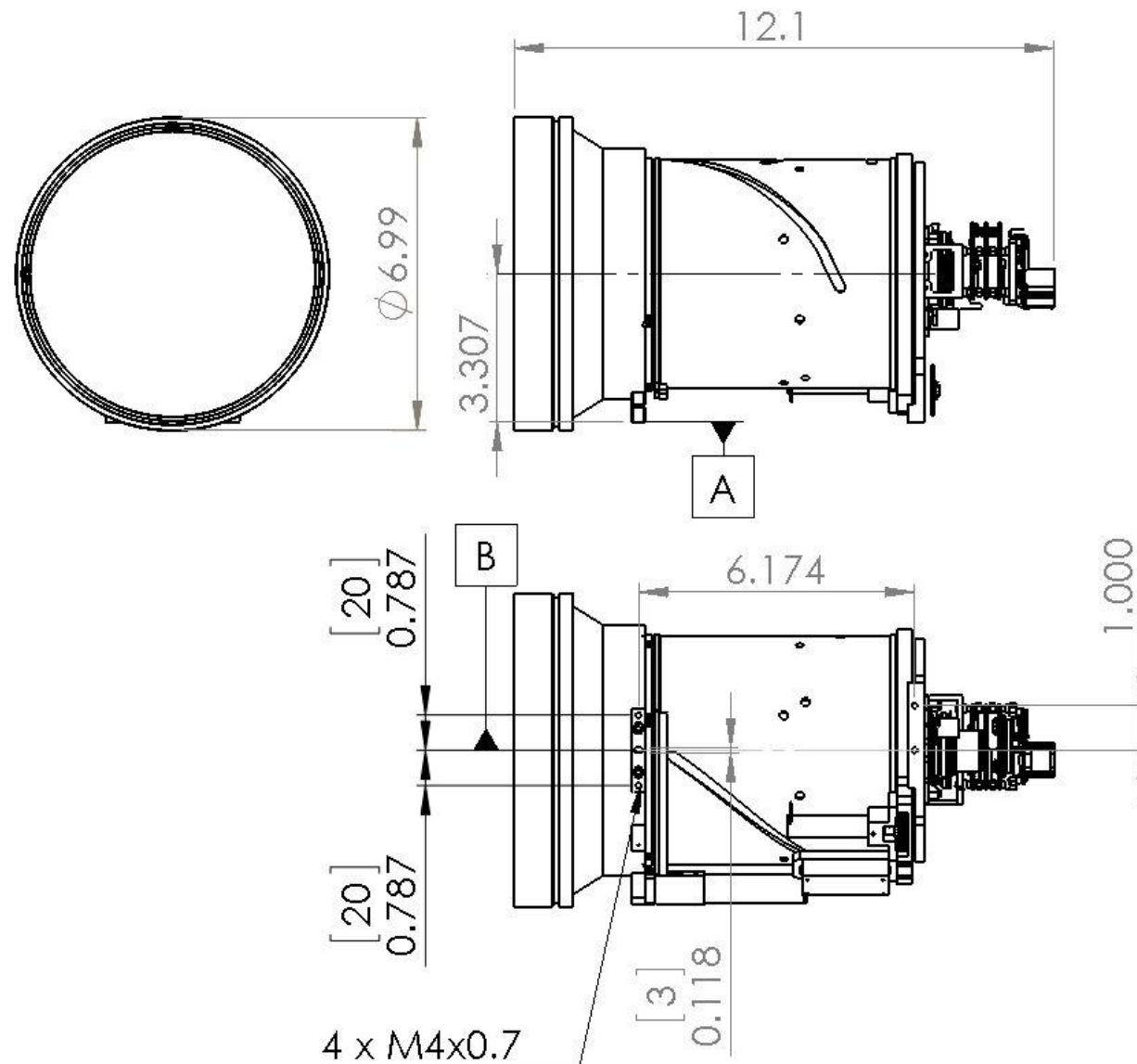
11.4 ATOM 1024 L Model Interface Physical Dimensions

Note: Drawing displays the model without a lens mounted.



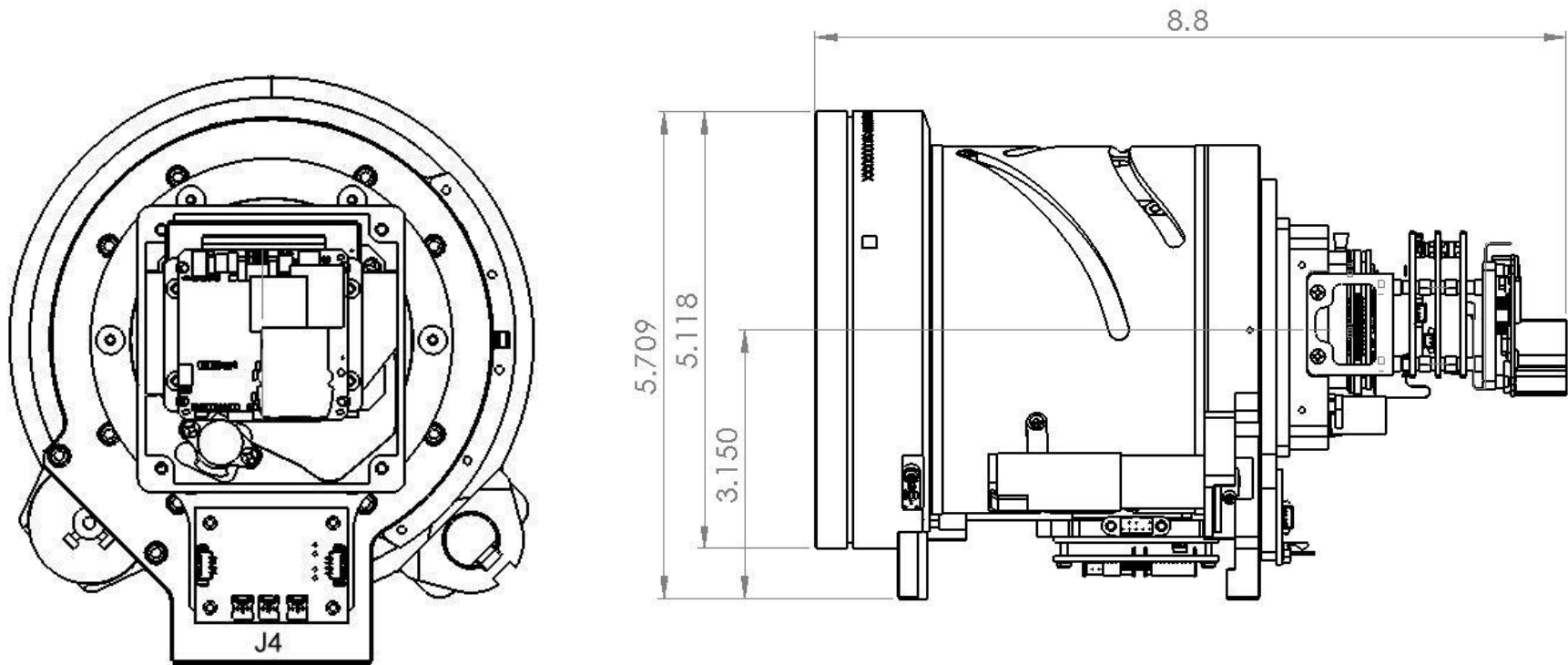
11.5

ATOM 1024 G (CZ 25-225mm) Model Interface Physical Dimensions



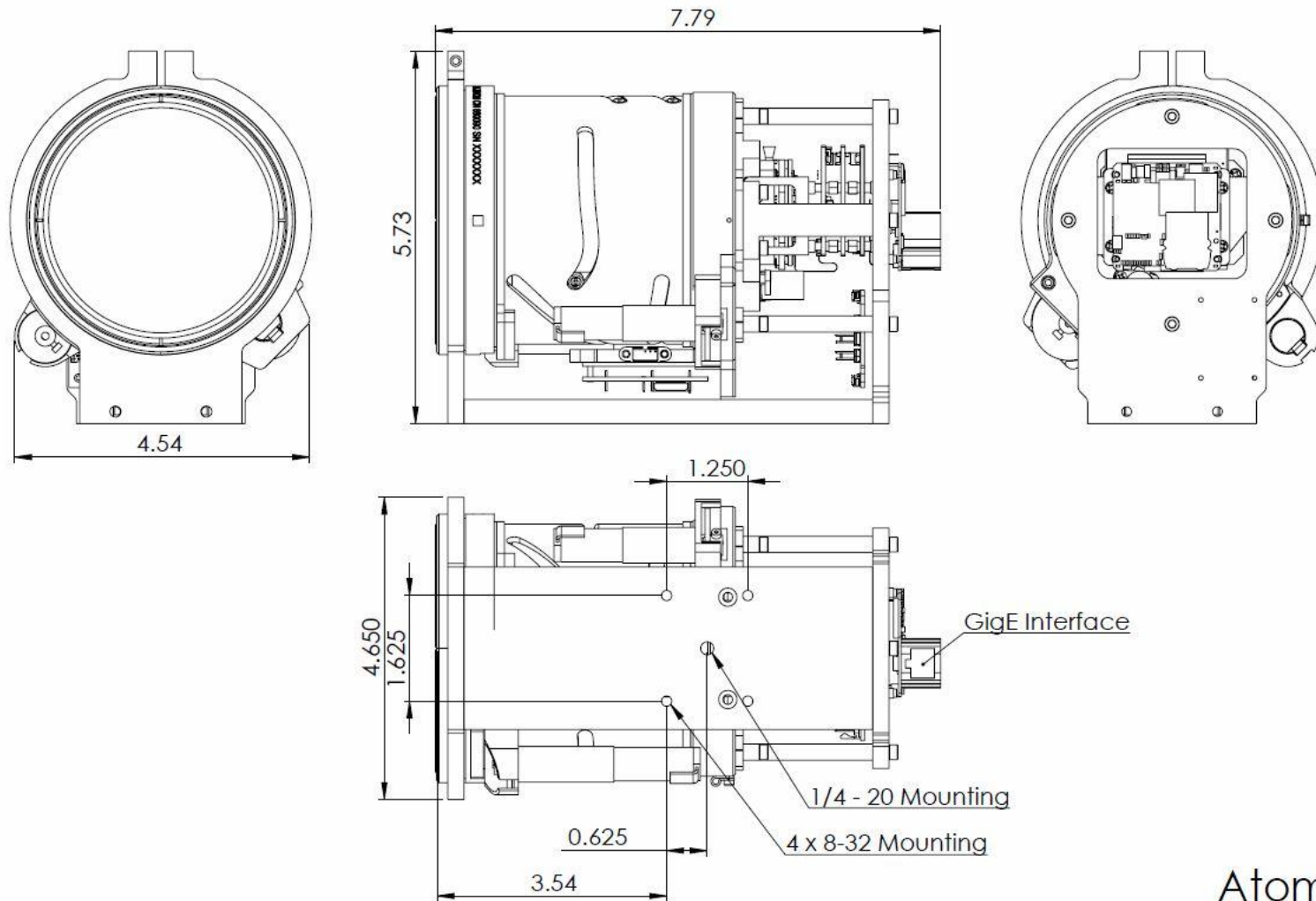
11.6

ATOM 1024 G (CZ 25-150mm) Model Interface Physical Dimensions



11.7

ATOM 1024 G (CZ 15-100mm) Model Interface Physical Dimensions



Atom1024_15-100_CZ

12 Specifications

<i>Infrared Engine Model</i>	<i>ATOM 1024</i>
FPA	Uncooled ASi Microbolometer
Size	1024 x 768
Pixel Pitch	17 μ m
Frame Rate (full frame)	30 Hz
Thermal Time Constant	< 10 ms
Digital Output	LVTTL (L model), Gigabit Ethernet (G model), Camera Link (C model)
Size: (W x H x D) (w/o lens, Camera Link option)	61 x 69 x 66mm (2.4" x 2.7" x 2.6")
Weight (w/o lens, LVTTL option)	< 250g
Weight (w/o lens, Camera Link option)	<390g
Weight (w/o lens, Gigabit Ethernet option)	<500g
Input Voltage	6 – 12 VDC
Power Consumption	< 1.7W LVTTL; < 2.2W Camera Link < 3.6W Gigabit Ethernet
Detector Thermal Sensitivity ¹	< 50 mK
Time to First Image	< 4 sec
Video Processing	Non-uniform Correction
Operational Temperature	-40°C to 60°C
Non-operation Temperature	-45°C to 70°C

¹ Normalized to unity transmission and f1.0 lens

13 Maintenance

13.1 Cleaning

13.1.1 Non-Optical Surfaces

The non-optical surfaces of the ATOM 1024 Camera can be cleaned with water, mild detergents, and a soft cloth.

13.1.2 Optical Surfaces

The optical surfaces of the lens should only be cleaned when visibly dirty. Care should be taken to avoid touching the exposed lens faces. Skin acid left behind with fingerprints can be damaging to coatings and lens substrates.

First use a jet of dry air or blow across the surface to remove any sand or abrasive particles before cleaning. If oil, water spots, or fingerprints form on the optical surfaces, clean as soon as possible using a soft cotton cloth and mild neutral soap diluted with lukewarm distilled water (1 part soap to 100 parts water), followed by reagent-grade isopropyl alcohol or acetone swab. Dust can be removed gently using an alcohol or acetone swab.

Note: Avoid swabs that incorporate plastic stems, as some plastics will dissolve in alcohol or acetone.

13.2 Replacing Components

There are no user serviceable parts inside the camera. For service, please contact Sofradir-EC.

14 Warranty

- 1) Seller warrants that at the time of delivery to the carrier, the Products are free from defects in material and workmanship. Any warranty described herein shall extend to the first ultimate user only for a period of one year from the date of shipment from Seller's factory except as otherwise stated in our written quotation.
- 2) Seller's obligation under this warranty shall be limited to furnishing a replacement for, or at Seller's option, repairing any part that, to the Seller's satisfaction, proves defective, provided such part is returned to the Seller's service facilities in New Jersey, all transportation charges paid (including freight, insurance, customs, duties, taxes, etc.). No part may be returned without Seller's prior return authorization approval.
- 3) Seller shall not be responsible for installation costs. In no event will any claim for labor in removing or replacing defective parts or for incidental or consequential damages be allowed.

- 4) No warranty is made as to Products which have not been installed, operated or maintained in accordance with Seller's instructions or the instructions contained in its operations or maintenance manuals when furnished by Seller, or which have been subject to misuse, abuse, accident or alteration or to improper or negligent use, maintenance, storage, transportation or handling.
- 5) Products not manufactured by Seller which are sold by Seller are covered exclusively by the original manufacturer's warranty and Seller may, at its option, assign to Buyer its warranty claims against the original manufacturer of defective Products in full settlement of Buyer's possible claims against Seller with regard to such Products.
- 6) Where Buyer is a distributor, financing company or similar entity acting for or on behalf of the initial user of the equipment, the warranty is transferable to the initial user only. In all other cases, the warranty is limited to the Buyer and is not transferable unless agreed to in writing by the Seller.
- 7) Caveat Emptor: The Warranty contained herein is exclusive and expressly in lieu of all other warranties, written, oral, implied or statutory, including but not limited to express or implied warranties of merchantability or of fitness. In addition, Seller shall not be liable for any loss, damage or injury of any nature, whether direct, indirect or consequential, in connection with or resulting from use of the Products.

15 Repairs

15.1 Returning Products for Warranty Repair

Return the product to your Authorized Dealer. Dealer will notify the service department by telephone before returning any product.

OR

Contact the manufacturer directly through the phone number and address provided on the contact sheet at the end of this booklet.

A Return Authorization (RA) number will be assigned by the service department. This number must be marked clearly on the outside of the package being returned.

Service department will provide a shipping address.

The following information must be included on the packing slip:

Model and serial number of camera

Your shipping address

Your billing address (if different)

Your fax, telephone numbers and/or email address

Description of the problem

Name of the point of contact

Return authorization number

Repaired equipment will be returned prepaid (surface freight only). If goods are being returned from outside the United States, the shipper is responsible for all customs and brokerage charges.

15.2 Returning Products for “Out of Warranty” Repair

Following expiration of the warranty period, the owner is financially obligated to pay for any repairs that are required. The owner may either return their camera to their dealer, or, they may work with the manufacturer directly. If you choose to deal directly with the manufacturer, you may contact us through the phone number and address provided in the Contact Information section at the end of this booklet.

You are required to provide the following information:

Model and serial number of camera

Your shipping address

Your billing address (if different)

Your fax, telephone numbers and/or email address

Description of the problem

Name of the point of contact

Return authorization number

You will be asked for payment of an evaluation fee prior to us starting work. Following evaluation, when the extent of the repairs is known, the manufacturer will contact you and estimate the total cost of the repair. If you choose not to have the repair completed, you will still be liable for the evaluation fee. If you choose to authorize the repair, the camera will be repaired and returned following receipt of payment.

16 Contact Information

Sofradir-EC Incorporated

373 Route 46 West

Fairfield, NJ 07004

USA

Telephone: (973) 882-0211

Fax: (973) 882-0997

E-mail: service@sofradir-ec.com